TABLE OF THE ISOTOPES
(Revised 1998)

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This table presents an evaluated set of values for the experimental quantities, which characterize the decay of radioactive nuclides. A list of the major references used in this evaluation is given below. When uncertainties are not listed, they are assumed to be five or less in the last digit quoted. If they exceed five in the last digit, the value is prefaced by an approximate sign. The effective literature cutoff date for data in this edition of the Table is January, 1998. The assistance of Felicia Kramer in assembling this file is gratefully acknowledged.

TABLE LAYOUT

Column No.	Column Title	Description
1	Isotope or Element	For elements, the atomic number and chemical symbol are listed. For nuclides, the mass number and chemical symbol are listed. Isomers are indicated by the addition of m, m1, or m2.
2	Isotopic Abundance	in atom percent.
3	Atomic Mass or Atomic Weight	Atomic mass relative to $^{12}C = 12$. Atomic weight is given on the same scale.
4	Half-life	Half-life in decimal notation. μs = microseconds; ms = milliseconds; s = seconds; m = minutes; h = hours; d = days; and y = years.
5	Decay Mode/Energy	Decay modes are α = alpha particle emission; β^- = negative beta emission; β^+ = positron emission; EC = orbital electron capture; IT = isomeric transition from upper to lower isomeric state; n = neutron emission; SF = spontaneous fission. Total disintegration energy in MeV units.
6	Particle Energy/Intensity	End point energies of beta transitions and discrete energies of alpha particles in MeV and their intensities in percent.
7	Spin and Parity	Nuclear spin or angular momentum of the nuclides in units of $h/2\pi$; parity is positive or negative.
8	Magnetic Dipole Moment	Magnetic dipole moments in nuclear magneton units.
9	Electric Quadrupole Moment	Electric quadrupole moments in barn units (10^{-24} cm^2).
10	Gamma Ray Energy/Intensity	Gamma ray energies in MeV and intensities in percent. Ann. rad. refers to the 511.006 keV photons emitted in the annihilation of positrons in matter.

GENERAL NUCLEAR DATA REFERENCES

The following references represent the major sources of the nuclear data presented, along with subsequent published journals and reports:

1. G. Audi, O. Bersillon, J. Blachot, A.H. Wapstra, *The Nubase Evaluation of Nuclear and Decay Properties,* Nuclear Physics A624, 1 (1997).
2. International Commission on Atomic Weights, *Atomic Weights of the Elements - 1995,* Pure & Applied Chemistry 68, 2339 (1996).
3. J.R. Parrington, H.D. Knox, S. Breneman, E.M. Baum, F. Feiner, *Chart of the Nuclides, 15th Edition,* Knolls Atomic Power Lab. (1996)
4. N.E. Holden, *Total and Spontaneous Fission Half-lives for Uranium, Plutonium, Americium and Curium Nuclides,* Pure & Applied Chemistry 61, 1483 (1989).
5. N.E. Holden, *Half-lives of Selected Nuclides,* Pure & Applied Chemistry 62, 941 (1990).

6. N.E. Holden, *Review of Thermal Neutron Cross Sections and Isotopic Composition of the Elements,* BNL-NCS-42224 (March 1989).
7. P. Raghavan, *Table of Nuclear Moments,* Atomic Data Nuclear Data Tables 42, 189 (1989).
8. E. Brown, R. Firestone, *Radioactivity Handbook,* Wiley Interscience Press (1986).
9. J.K. Tuli, *Nuclear Wallet Cards,* Brookhaven National Laboratory (July 1995).

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Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
$_0$n		**1.008664924**	**10.3 m**	**β-/0.78235**	**0.782/100.**	**1/2+**	**-1.913043**		
$_1$H		**1.00794(7)**							
^{1}H	99.985(1)	1.007825032				1/2+	+2.79285		
^{2}H	0.015(1)	2.014101778				1+	+0.85744	+2.86 mb	
^{3}H		3.016049268	12.32 y	β-/0.01859	0.01860/100.	1/2+	+2.97896		
$_2$He		**4.002602(2)**							
^{3}He	1.37×10^{-4}	3.016029309				1/2+	-2.12762		
^{4}He	≈100.	4.002603250				0+			
^{5}He		5.01222	7.6×10^{-22} s	n,α		3/2-			
^{6}He		6.018888	0.807 s	β-/3.508,d	3.510/100.	0+			
^{7}He		7.02803	$3.\times10^{-21}$ s	n		(3/2)-			
^{8}He		8.03392	0.119 s	β-/10.65, t n/	13/88. /12.	0+			0.9807/84. 0.4776/5.
^{9}He		9.0438		n					
^{10}He		10.0524		2n					
$_3$Li		**6.941(2)**							
^{5}Li		5.01254	$\approx3.\times10^{-22}$ s			3/2-			
^{6}Li	7.5(2)	6.0151223				1+	+0.82205	-0.8 mb	
^{7}Li	92.5(2)	7.0160041				3/2-	+3.25644	-0.041	
^{8}Li		8.022486	0.84 s	β-/16.004 α/	12.5/100. α(1.6)	2+	+1.6536	+0.032	
^{9}Li		9.026789	0.178 s	β-/13.606 β-/	13.5/75. 11/25.	3/2-	3.439	0.028	
^{10}Li		10.03590	$4.\times10^{-22}$ s	β- /20.84					
^{11}Li		11.04380	8.4 ms	β-/20.6 n,2n,3n,α		3/2(-)	3.668	0.031	3.367/35. (0.22-2.81)
$_4$Be		**9.012182(3)**							
^{6}Be		6.01973	5.0×10^{-21} s	2p,α		0+			
^{7}Be		7.0169293	53.28 d	EC/0.8618		3/2-			0.4776/10.4
^{8}Be		8.00530509	$\approx 7.\times10^{-17}$ s	2α/0.046		0+			
^{9}Be	100.	9.0121822				3/2-	-1.1776	+0.053	
^{10}Be		10.0135338	1.52×10^{6} y	β-/0.5559	0.555/100.	0+			
^{11}Be		11.02166	13.8 s	β-,β-α/11.51	11.48/61.	1/2+			2.125/35.5 (0.478-7.97)
^{12}Be		12.02692	24. ms	β-,(n)/11.71		0+			(0.95-4.4)
^{13}Be		13.0361							
^{14}Be		14.0428	4.3 ms	β-,(n)/16.2		0+			
$_5$B		**10.811(7)**							
^{7}B		7.0299	$4.\times10^{-22}$ s	p					
^{8}B		8.024607	0.770 s	β^+, 2α/17.979	13.7(β^+)/93.	2+	1.0355	0.068	ann.rad.
^{9}B		9.013329	8×10^{-19} s	p2α/		3/2-			
^{10}B	19.9(2)	10.0129371				3+	+1.8006	+0.085	
^{11}B	80.1(2)	11.0093055				3/2-	+2.6886	+0.0406	

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^{12}B		12.014352	0.0202 s	β-/13.369		1+	+1.0031	0.0132	4.438/1.3
				β- α/1.6/					3.215/0.00065
^{13}B		13.017780	0.0174 s	β- /13.437	13.4	3/2-	+3.17778	0.037	3.68/7.6
				β- n/0.25/	2.43(n)/0.09				
					3.55(n)/0.16				
^{14}B		14.02540	14. ms	β- /20.64		2-	1.185	0.0298	6.094/90.
^{15}B		15.03110	10.4 ms	β- ,(n)/19.09		(3/2-)	2.66	0.038	
^{16}B		16.0398	<1.9x10^{-10} s						
^{17}B		17.0469	5.1 ms	β-,(n)/22.7			2.55		
^{19}B		19.0637		β-/26.5					
$_{6}$C		**12.0107(8)**							
^{8}C		8.03768	2.0x10^{-21} s	p					
^{9}C		9.031040	127. ms	β^+ ,p, 2α/16.498			(3/2-)	-1.391	ann.rad.
^{10}C		10.0168532	19.3 s	β^+ /3.648	1.865	0+			ann.rad.
									0.71829/100.
^{11}C		11.011433	20.3 m	β^+ ,EC/1.982	0.9608/99.	3/2-	-0.964	0.0333	ann.rad.
^{12}C	98.93(8)	12.000000000					0+		
^{13}C	1.07(8)	13.003354838					1/2-	+0.70241	
^{14}C		14.003241991		5715. y	β- /0.15648	0.1565/100.	0+		
^{15}C		15.010599	2.45 s	β- /9.772	4.51/68.	1/2+	1.32		5.298/68.
					9.82/32.				(7.30-9.05)
^{16}C		16.014701	0.75 s	β- ,n/8.012					
^{17}C		17.02258	0.19 s	β- ,n/13.17					1.375
									1.849
									1.906
^{18}C		18.02676	0.09 s	β- ,n/11.81					
^{19}C		19.0353	0.05 s	n					
^{20}C		20.0403	0.01 s						
^{21}C		21.0493							
^{22}C		22.056							
$_{7}$N		**14.00674(7)**							
^{12}N		12.018613	11.00 ms	β^+ ,β^+ α/17.338	16.38/95.	1+	+0.457	+0.026	ann.rad.
									4.438/2.
^{13}N		13.0057386	9.97 m	β^+ /2.2204	1.190/100.	1/2-	0.3222		
^{14}N	99.632(7)	14.003074007					1+	+0.40376	+0.020
^{15}N	0.368(7)	15.00010897				1/2-	-0.28319		
^{16}N		16.006100	7.13 s	β- /10.419	4.27/68.	2-			6.129/68.8
					10.44/26.				7.115/4.7
				β-, α	1.85/.0012				(0.99-8.87)
^{17}N		17.00845	4.17 s	β- ,β- n/8.68	3.7/100.	1/2-	0.352		0.871/3.
				0.4-1.7n/95.					2.1842/0.3
				β- α/	8.0, 8.2				
^{18}N		18.01408	0.62 s	β- /13.90	9.4/100.	1-			0.822/61.
									1.65/60.5
									1.982/98.
									(0.535-7.13)
^{19}N		19.01703	0.32 s	β-/12.53					(0.096-3.14)
^{20}N		20.02337	0.14 s	β- /17.97					
^{21}N		21.0271	0.08 s						
^{22}N		22.0344	0.02s						

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^{23}N		23.0405							
$_{8}$O		**15.9994(3)**							
^{12}O		12.03440	≈ 1.x10^{-21} s	2p					
^{13}O		13.02481	8.9 ms	β^{+} ,p/17.77	1.56 (p)/	(3/2-)	1.389		ann.rad. 4.438/0.56
^{14}O		14.0085953	70.60 s	β^{+} /5.1430	1.81/99.	0+			ann.rad. 2.312/99.4
^{15}O		15.0030655	122.2 s	β^{+} /2.754	1.723/100.	1/2-	0.719		ann.rad.
^{16}O	99.757(16)	15.994914622				0+			
^{17}O	0.038(1)	16.9991315				5/2+	-1.8938	-0.026	
^{18}O	0.205(14)	17.999160				0+			
^{19}O		19.003579	26.9 s	β- /4.820	3.25/60. 4.60/40.	5/2+			0.197/95.9 1.3569/50.4 (0.11-4.18)
^{20}O		20.004076	13.5 s	β- /3.814		0+			1.057/100.
^{21}O		21.00866	3.4 s	β- /8.11					(0.28-4.6)
^{22}O		22.00997	2.2 s	β- /6.5					(0.64-1.86)
^{23}O		23.0157	0.08 s						
^{24}O		24.0204	0.06 s						
$_{9}$F		**18.9984032(5)**							
^{15}F		15.0180	5.x10^{-22} s	p		(1/2+)			
^{16}F		16.01147	≈ 1.x10^{-20} s	p		0-			
^{17}F		17.0020952	64.5 s	β^{+} /2.761	1.75/	5/2+	+4.722	0.058	ann.rad.
^{18}F		18.000938	1.830 h	β^{+} ,EC/1.656	0.635/97.	1+			
^{19}F	100.	18.9984032				1/2+	+2.62887	0.072	
^{20}F		19.9999813	11.00 s	β- /7.0245	5.398/100.	2+	+2.094	0.042	1.634/100. 3.33/0.009
^{21}F		20.999949	4.16 s	β- /5.684	3.7/8. 5.0/63. 5.4/29.	5/2+			0.3507/90. 1.395/15. (1.746-4.684)
^{22}F		22.00300	4.23 s	β- /10.82	3.48/15. 4.67/7. 5.50/62.	4+			1.2746/100. 2.0826/82. (0.82-4.37)
^{23}F		23.00357	2.2 s	β- /8.5		5/2+			1.701/48. 2.129/34. (0.493-3.83)
^{24}F		24.0081	0.3 s	β- /13.5					1.9816/
^{25}F		25.0121	0.06 s	β^{-},(n)					
^{26}F		26.0196	0.03 s						
^{27}F		27.0269	5. ms						
^{29}F		29.043	2. ms						
$_{10}$Ne		**20.1797(6)**							
^{16}Ne		16.02575	4.x10^{-21} s	2p					
^{17}Ne		17.01770	109. ms	β^{+} .p/14.53	1.4-10.6/	1/2-			ann.rad./ 0.495
^{18}Ne		18.005697	1.67 s	β^{+} /4.446	3.416/92.	0+			ann.rad./ 1.0413/7.8 (0.658-1.70)
^{19}Ne		19.001880	17.22 s	β^{+} /3.238	2.24/99.	1/2+	-1.885		ann.rad./

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									(0.11-1.55)
^{20}Ne	90.48(3)	19.992440176					0+		
^{21}Ne	0.27(1)	20.99384674				3/2+	-0.66180	+0.103	
^{22}Ne	9.25(3)	21.9913855				0+		-0.19	
^{23}Ne		22.9944673	37.2 s	β- /4.376	3.95/32. 4.39/67.	5/2+	-1.08		0.440/33. (1.64-2.98)
^{24}Ne		23.99362	3.38 m	β- /2.47	1.10/8. 1.98/92.	0+			0.4723/100. 0.874/7.9
^{25}Ne		24.99779	0.61 s	β- /7.30	6.3/ 7.3/	1/2+			0.0895/96. (0.98-3.69)
^{26}Ne		26.00046	197 ms	β- /7.3					0.233/
^{27}Ne		27.0076	32 ms	β-, n/12.7					
^{28}Ne		28.0121	18. ms	β-, n/12.3					
^{29}Ne		29.0194	15. ms	β- /15.4					
^{30}Ne		30.024	7. ms						
^{31}Ne		31.033							
^{32}Ne		32.040							
$_{11}$Na		**22.989770(2)**							
^{19}Na		19.01388	0.03 s	β^+ ,p/11.18					
^{20}Na		20.00735	0.446 s	β^+ /13.89 α	 2.15/	2+	+0.3694		ann.rad./ 1.634/79.
^{21}Na		20.997655	22.48 s	β^+ /3.547	2.50/95.	3/2+	+2.3863	+0.05	ann.rad./ 0.351/5.
^{22}Na		21.9944366	2.605 y	β^+ /90/2.842 EC/10/	0.545/90.	3+	+1.746		ann.rad./ 1.2745/99.9
^{23}Na	100.	22.9897697				3/2+	+2.21752	+0.101	
^{24m}Na			20.2 ms	I.T.,β-		1+			0.4723/100.
^{24}Na		23.9909633	14.96 h	β- /5.5158	1.389/>99.	4+	+1.690		1.3686/100. 2.754/100. (0.997-4.238)
^{25}Na		24.989954	59.3 s	β- /3.835	2.6/7. 3.15/25. 4.0/65.	5/2+	+3.683	-0.10	0.3897/12.7 0.5850/13. 0.9747/14.9 (0.836-2.80)
^{26}Na		25.99259	1.07 s	β- /9.31		3+	+2.851	-0.08	1.809/98.9
^{27}Na		26.99401	0.290 s	β- /9.01 β- ,n/	7.95/	5/2+	+3.90	-0.06	0.9847/87.4 1.698/11.9
^{28}Na		27.9989	31. ms	β- /14.0 β- ,n/	12.3/	1+	+2.43	-0.02	1.473/37. 2.389/18.6
^{29}Na		29.0028	44. ms	β- ,n/13.3	11.5/	3/2+	+2.45	-0.03	2.560/36. (1.04-3.99)
^{30}Na		30.0092	50. ms	β- /17.5		2	+2.08		1.483/46.
^{31}Na		31.0136	17.2 ms	/15.9 β- ,n		(3/2-)	+2.31		1.483/14. (0.05-3.54)
^{32}Na		32.0197	13.5 ms	β- /19.1					0.886/60.
^{33}Na		33.027	8.1 ms	β- /20.					0.886/16.
^{34}Na		34.035	5. ms	β- /24.					0.886/60.
^{35}Na		35.044	1.5 ms	β- /24					
$_{12}$Mg		**24.3050(6)**							
^{20}Mg		20.01886	96. ms	β^+ ,p/10.73					
^{21}Mg		21.01171	122. ms	β^+ ,p/13.10		5/2+			0.332/51.

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^{22}Mg		21.999574	3.86 s	β^+ /4.786	3.05/	0+			0.0729/60. 0.5820/100. (1.28-1.93)
^{23}Mg		22.994125	11.32 s	β^+ /4.057	3.09/92.	3/2+	0.536		0.440/8.2
^{24}Mg	78.99(4)	23.9850419				0+			
^{25}Mg	10.00(1)	24.9858370				5/2+	-0.85545	+0.199	
^{26}Mg	11.01(3)	25.9825930				0+			
^{27}Mg		26.9843407	9.45 m	β- /2.6103	1.59/41. 1.75/58. 2.65/0.3	1/2+			0.17068/0.8 0.84376/73. 1.01443/29.
^{28}Mg		27.983877	20.9 h	β- /1.832	0.459/95.	0+			0.0306/95. 0.4006/36. 0.9418/36. 1.342/54.
^{29}Mg		28.98855	1.3 s	β- /7.55	5.4/	3/2+			0.960/15. 1.398/16. 2.224/36.
^{30}Mg		29.9905	0.32 s	β- /7.0		0+			0.224/85.
^{31}Mg		30.9966	0.24 s	β- /11.7		(3/2+)			1.61/26.
^{32}Mg		31.9992	0.12 s	β- /10.3					2.765/25.
^{33}Mg		33.0056	0.09 s	β- /13.7					1.848/
^{34}Mg		34.0091	0.02 s	β- /11.3					
^{35}Mg		35.0175							
^{36}Mg		36.022							
^{37}Mg		37.031							
^{38}Mg									
$_{13}$Al		**26.981538(2)**							
^{22}Al		22.0195	59. ms	β^+ /18.6 β^+,p,2p,α/		4+			ann.rad./
^{23}Al		23.00727	0.47 s	β^+ /12.24 β^+ ,p/					ann.rad./
^{24m}Al			0.129 s	I.T./0.4259 β^+	13.3	1+			1.3686/5.3
^{24}Al		23.999941	2.07 s	β^+ /13.878,p	3.40/48. 4.42/41. 6.80/3. 8.74/8.	4+			1.078(2)/16. 1.368(2)/96. 2.753(2)/43. 4.315(3)/15. 5.392(3)/20. 7.0662(2)/41.
^{25}Al		24.990429	7.17 s	β^+ /4.277	3.27/	5/2+	3.646		ann.rad./ 1.6115(2)/100. 0.975(2)/5.
^{26m}Al			6.345 s	β^+ /	3.2/	0+			ann.rad./
^{26}Al		25.9868917	7.1x10^5 y	β^+ /82/4.0042 EC/18/	1.16/	5+	+2.804		ann.rad./ 1.80865(7)/99.8
^{27}Al	100.	26.9815384				5/2+	+3.64151	+0.15	
^{28}Al		27.9819102	2.25 m	β- /4.6422	2.865/100.	3+	3.24	0.18	1.7778(6)/100.
^{29}Al		28.980445	6.5 m	β- /3.680	1.4/30. 2.5/70.	5/2+			1.2732(8)/89. 2.0282(8)/4. 2.4262(8)/7.
^{30}Al		29.98296	3.68 s	β- /8.56	5.05/	3+			1.26313(3)/35. 2.23525(5)/65.
^{31}Al		30.98395	0.64 s	β- /8.00	6.25/				0.75223(3)/18.

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									1.69473(3)/59. 2.31664(4)/73.
^{32}Al		31.9881	33. ms	β- /13.0		1+			
^{33}Al		32.9909	41. ms						
^{34}Al		33.9969	≈42. ms	β- /17.1					
^{35}Al		34.9999	30 ms						
^{36}Al		36.0064	0.09 s						
^{37}Al		37.010							
^{38}Al		38.0169							
^{39}Al		39.022							
^{40}Al									
^{41}Al									
$_{14}$Si		**28.0855(3)**							
^{22}Si		22.0345	29. ms	β^+,p	1.99/20				
^{23}Si		23.0255	40.7 ms	β^+,p/5.9	1.32,2.40,2.83				
^{24}Si		24.01155	0.14 s	β^+,p/10.81					ann.rad./
^{25}Si		25.00411	221 ms	β^+,p/12.74		5/2+			ann.rad./
^{26}Si		25.992330	2.23 s	β^+ /5.066	3.282/	0+			ann.rad./ 0.8294(8)/22.
^{27}Si		26.9867048	4.14 s	β^+ /4.8118	3.85/100.	5/2+	-0.8554		ann.rad./ 2.211(5)/0.2
^{28}Si	92.22(2)	27.97692653				0+			
^{29}Si	4.69(1)	28.97649472				1/2+	-0.5553		
^{30}Si	3.09(1)	29.97377022				0+			
^{31}Si		30.9753633	2.62 h	β- /1.4920	1.471/99.9	3/2+			1.2662(5)/0.05
^{32}Si		31.974148	$1.6x10^2$ y	β- /0.224	0.213/100.	0+			
^{33}Si		32.97800	6.1 s	β- /5.85	3.92	(3/2+)			1.4313(5)/13. 1.84769(5)/100. 2.538(2)/10.
^{34}Si		33.97858	2.8 s	β- /4.60	3.09/	0+			0.42907(5)/60. 1.17852(2)/64. 1.60756(5)/36.
^{35}Si		34.98458	0.9 s	β- /10.50					
^{36}Si		35.9867	0.5 s	β- /7.9					
^{37}Si		36.9930	≈0.09 s						
^{38}Si		37.9960							
^{39}Si		39.0023							
^{40}Si		40.0058							
^{41}Si		41.013							
^{42}Si		42.016							
$_{15}$P		**30.973761(2)**							
^{26}P		26.0118	≈20. ms	β^+ ,p/18.1		3+			
^{27}P		26.99919	0.3 s	β^+,p /11.63		1/2+			
^{28}P		27.992312	270. ms	β^+ /14.332	3.94/13. 5.25/13. 6.96/16. 8.8/7. 11.49/52.	3+			ann.rad./ 1.779(2)/98. 2.839(2)/2.8 3.040(2)/3.2 4.498(2)/12. 7.537(2)/9.
^{29}P		28.981801	4.14 s	β^+ /4.9431	3.945/98.	1/2+	1.2349		ann.rad./ 1.273/1.32

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{30}P		29.9783138	2.50 m	β^+ /4.2323	3.245/99.9	1+			2.426/0.39 ann.rad./ 2.230(3)/0.07
^{31}P	100.	30.9737615				1/2+	+1.13160		
^{32}P		31.9739071	14.28 d	β- /1.7106	1.710/100.	1+	-0.2524		
^{33}P		32.971725	25.3 d	β- /0.249	0.249/100.	1/2+			
^{34}P		33.973636	12.4 s	β- /5.374	3.2/15. 5.1/85.	1+			1.78-4.1/ 2.127(5)/15.
^{35}P		34.973314	47. s	β- /3.989	2.34/100.	1/2+			1.572(1)/100.
^{36}P		35.97826	5.7 s	β- /10.41					0.902/77. 3.291/100.
^{37}P		36.97961	2.3 s	β- /7.90					0.6462/ 1.5829/
^{38}P		37.9845	0.6 s	β- /12.4					1.2923/ 2.224/
^{39}P		38.9864	≈ 0.16 s						
^{40}P		39.9911							
^{41}P		40.9948	0.12 s						
^{42}P		42.0001	0.11 s						
^{43}P		43.0033	33. ms	β^-,(n)/					
^{44}P		44.010							
^{45}P		45.015							
^{46}P		46.024							
$_{16}$S		**32.066(6)**							
^{27}S		27.0188	21. ms	β^+, 2p /18.3					
^{29}S		28.99661	0.188 s	β^+ /13.79 β^+,p/		5/2+			ann.rad./
^{30}S		29.984903	1.18 s	β^+ /6.138	4.42/78. 5.08/20.	0+			ann.rad./ 0.678/79.
^{31}S		30.979555	2.56 s	β^+ /5.396	4.39/99.	1/2+	0.48793		ann.rad./ 1.2662(5)/1.2
^{32}S	94.93(31)	31.9720707				0+			
^{33}S	0.76(2)	32.9714585				3/2+	+0.64382	-0.07	
^{34}S	4.29(28)	33.9678668				0+			
^{35}S		34.9690321	87.2 d	β- /0.1672	0.1674/100.	3/2+	+1.00	+0.047	
^{36}S	0.02(1)	35.9670809				0+			
^{37}S		36.9711257	5.05 m	β- /4.8653	1.64/94. 4.75/5.6				0.9083(4)/0.06 3.1033(2)/94.2
^{38}S		37.97116	2.84 h	β- /2.94	1.00/	0+			0.1962(4)/0.2 1.9421(3)/84.
^{39}S		38.97514	11.5 s	β- /6.64					1.301/52. 1.697/44.
^{40}S		39.9755	9. s	β- /4.7					
^{41}S		40.9800							
^{42}S		41.9815	≈0.56 s	β,(n)/					
^{43}S		42.987							
^{44}S		43.9883	0.12 s	β-, n/9.					
^{45}S		44.9948	0.08 s	β^-,n/					
^{46}S		45.9996							
^{47}S		47.008							
^{48}S		48.013							
$_{17}$Cl		**35.4527(9)**							

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{31}Cl		30.99242	0.15 s	β^+ ,p/11.98	1.52	3/2+			ann.rad./
^{32}Cl		31.98569	297. ms	β^+ /12.69	4.75/25. 6.18/10. 7.48/14. 9.47/50. 11.6/1.	1+			ann.rad./ 1.548(2)/3.5 2.2305(1)/92. 2.4638(1)/4. 2.885(1)/1. 4.770(1)/20.
^{33}Cl		32.977452	2.511 s	β^+ /5.583	4.51/98.	3/2+	+0.752		ann.rad./ 0.8409/0.52 1.966/0.45 2.866/0.44
^{34m}Cl			32.2 m	β^+ / I.T./	1.35/24. 2.47/28.	3+			ann.rad./ 0.1457(8)/42. 2.1276(5)/42.
^{34}Cl		33.9737620	1.528 s	β^+ /5.4922	4.50/100.	0+			ann.rad./
^{35}Cl	75.78(4)	34.96885271				3/2+	+0.82187	-0.08	
^{36}Cl		35.9683069	3.01×10^5 y	β- /0.7086	0.7093/98. β^+,EC/1.1421	0+ 0.115/0.002	+1.28547	-0.018	ann.rad./
^{37}Cl	24.22(4)	36.96590260				3/2+	+0.68412	-0.065	
^{38m}Cl			0.715 s	I.T./		5-			0.67138(2)/100.
^{38}Cl		37.9680106	37.2 m	β- /4.9168	1.11/31. 2.77/11. 4.91/58.	2-	2.05		1.64216(1)/31. 2.16760(2)/42.
^{39}Cl		38.968008	55.6 m	β- /3.442	1.91/85. 2.18/8. 3.45/7.	3/2+			0.25026(1)/47. 1.26720(5)/54. 0.986-1.517
^{40}Cl		39.97042	1.38 m	β- /7.48		2-			0.6431(3)/6. 1.4608(1)/77. 2.8402(2)/17.
^{41}Cl		40.9707	34. s	β- /5.7	3.8/				(0.167-1.359)
^{42}Cl		41.9732	6.8 s	β- /9.4					
^{43}Cl		42.9742	3.3 s	β- /8.0					
^{44}Cl		43.9785	≈0.43 s	β-,n/12.3					
^{45}Cl		44.980	0.40 s	β-, n/11.					
^{46}Cl		45.984	0.22 s	β-, n/14.9					
^{47}Cl		46.988		β-, n/15.					
^{48}Cl		47.995							
^{49}Cl		48.9999							
^{51}Cl		51.014							
$_{18}$Ar		**39.948(1)**							
^{31}Ar		31.0121	15. ms	β^+ /18.4 β^+, 2p β^+, 3p					
^{32}Ar		31.99766	98. ms	β^+ ,p/11.2					ann.rad./
^{33}Ar		32.98993	174. ms	β^+ /11.62 β^+ ,p/	3.12/	1/2+	-0.72		ann.rad./ 0.810(2)/48.
^{34}Ar		33.980270	0.844 s	β^+/6.061	5.0/95.	0+			ann.rad./ 0.6658(1)/2.5 3.1290(1)/1.3
^{35}Ar		34.975257	1.77 s	β^+/5.965	4.94/93.	3/2+	+0.633	-0.08	ann.rad./ 1.2185(5)/1.22

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									1.763(1)/0.25 2.964(1)/0.2
^{36}Ar	0.3365(30)	35.9675463				0+			
^{37}Ar		36.9667759	35.0 d	EC/.813		3/2+	+1.15	+0.076	
^{38}Ar	0.0632(5)	37.9627322				0+			
^{39}Ar		38.964313	268. y	β-/0.565	0.565/100.	7/2-	-1.3	-0.12	
^{40}Ar	99.6003(30)	39.962383123					0+		
^{41}Ar		40.964501	1.82 h	β-/2.492	1.198/	7/2-			1.29364(5)/99. 1.6770(3)/0.05
^{42}Ar		41.96305	33. y	β-/0.60	0.60/100.	0+			
^{43}Ar		42.9657	5.4 m	β-/4.6					0.4791(2)/10. 0.7380(1)/43 0.9752(1)/100. 1.4400(3)/39.
^{44}Ar		43.96537	11.87 m	β-/3.55		0+			0.182-1.866
^{45}Ar		44.96809	21.5 s	β-/6.9		7/2-			0.0610/25. 1.020/35. 3.707/34.
^{46}Ar		45.96809	8.4 s	β-/5.70		0+			1.944/
^{47}Ar		46.9722	$\approx$0.7 s	β^-					
^{49}Ar		48.9822							
^{50}Ar		49.986							
^{51}Ar		50.993							
$_{19}$K		**39.0983(1)**							
^{35}K		34.98801	0.19 s	β^+ /11.88 β^+ ,p/		3/2+			ann.rad./ 1.751/14. 2.5698/26. 2.9827/51.
^{36}K		35.98129	0.342 s	β^+ /12.81	5.3/42. 9.9/44.	2+	+0.548		ann.rad./ 1.97044(5)/82. 2.20783(5)/30. 2.43343(2)/32.
^{37}K		36.9733769	1.23 s	β^+ /6.149	5.13/	3/2+	+0.2032		ann.rad./ 2.7944(8)/2. 3.602(2)/0.05
^{38m}K			0.924 s	β^+ /6.742	5.02/100.	0+			ann.rad./
^{38}K		37.969080	7.63 m	β^+ /5.913	2.60/99.8	3+	+1.37		ann.rad./ 2.1675(3)/99.8 3.9356(5)/0.2
^{39}K	93.2581(44)	38.9637069				3/2+	+0.39146	+0.049	
^{40}K	0.0117(1)	39.9639987	1.26x10^9 y	β- /1.3111 β^+ ,EC/1.505	1.312/89. 1.50/10.7	4-	-1.298	-0.061	ann.rad./ 1.46081(5)/10.5
^{41}K	6.7302(44)	40.9618260				3/2+	+0.21487	+0.060	
^{42}K		41.9624031	12.36 h	β- /3.525	1.97/19. 3.523/81.	2-	-1.1425		0.31260(2)/0.3 1.5246(3)/18.
^{43}K		42.96072	22.3 h	β- /1.82	0.465/8. 0.825/87. 1.24/3.5 1.814/1.3	3/2+	+0.163		0.2211(2)/4. 0.3729(2)/88. 0.3971(2)/11. 0.6178(2)/81.
^{44}K		43.96156	22.1 m	β- /5.66	5.66/34.	2-	-0.856		0.368207(1)/2.2 1.15700(1)/58. 2.15079(2)/22.
^{45}K		44.96070	17.8 m	β- /4.20	1.1/23.	3/2+	+0.1734		0.1743(5)/80.

TABLE OF THE ISOTOPES

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					2.1/69. 4.0/8.				1.2607(8)/7. 1.7056(6)/69. 2.3542(5)/14.
^{46}K		45.96198	1.8 m	β- /7.72	6.3/	2-	-1.05		1.347(1)/91. 3.700(5)/28.
^{47}K		46.96168	17.5 s	β- /6.64	4.1/99. 6.0/1.	1/2+	+1.93		0.56474(3)/15. 0.58575(3)/85. 2.01313(3)/100.
^{48}K		47.96551	6.8 s	β- /12.09	5.0/	(2-)			0.67122(1)/4. 0.6723(5)/20. 0.78016(1)/32. 3.83153(7)/80.
^{49}K		48.9675	1.26 s	β- /11.0					2.025/ 2.252/
^{50}K		49.9728	0.472 s	β- /14.2					
^{51}K		50.9764	0.365 s	β- /					
^{52}K		51.983	0.105 s	β-					
^{53}K		52.987	30. ms	β-		3/2+			
^{54}K		53.994	10. ms	β-					
$_{20}$Ca		**40.078(4)**							
^{35}Ca		35.0048	0.05 s	β^+ /15.6					
^{36}Ca		35.99309	0.10 s	β^+,(p)/10.99 β^+ ,n/	2.52				ann.rad./
^{37}Ca		36.98587	0.18 s	β^+ /11.64 β^+ ,n/	3.103	3/2+			ann.rad./ 1.369
^{38}Ca		37.976319	0.44 s	β^+ /6.74		0+			ann.rad./ 1.5677(5)/25. 3.210(2)/1.
^{39}Ca		38.970718	0.861 s	β^+ /6.531	5.49/100.	3/2+	1.02168		ann.rad./
^{40}Ca	96.941(156)	39.9625912				0+			
^{41}Ca		40.9622783	1.02x10^5 y	EC/0.4214		7/2-	-1.595	-0.08	
^{42}Ca	0.647(23)	41.9586183				0+			
^{43}Ca	0.135(10)	42.9587668				7/2-	-1.3173	-0.05	
^{44}Ca	2.086(110)	43.955481				0+			
^{45}Ca		44.956186	162.7 d	β- /0.257	0.257/100.	7/2-	-1.327	+0.05	
^{46}Ca	0.004(3)	45.953693				0+			
^{47}Ca		46.954546	4.536 d	β- /1.992	0.684/84. 1.98/16.	7/2-	-1.38	+0.02	1.297/75 (0.041-1.88)
^{48}Ca	0.187(21)	47.952533				0+			
^{49}Ca		48.955673	8.72 m	β- /5.262	0.89/7. 1.95/92.	3/2-			3.0844(1)/92. 4.0719(1)/7.
^{50}Ca		49.95752	14. s	β- /4.97	3.12/	0+			0.2569/98. (0.0715-1.59)
^{51}Ca		50.9615	10. s	β- /7.3		(3/2-)			
^{52}Ca		51.9651	4.6 s	β- /8.0					
^{53}Ca		52.9701	0.09 s	β- /10.9					
^{54}Ca		53.975							
^{55}Ca		54.981							
^{56}Ca		55.986							
$_{21}$Sc		**44.955910(8)**							
^{39}Sc		38.98479		p					

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^{40}Sc		39.977964	0.182 s	β^+ /14.320	5.73/50. 7.53/15. 8.76/15. 9.58/20.	4-			ann.rad./ 0.752/41. 3.732/99.5 (1.12-3.92)
^{41}Sc		40.9692513	0.596 s	β^+ /6.4953	5.61/100.	7/2-	5.431	0.166	ann.rad./
^{42m}Sc			61.6 s	β^+ /	2.82/	7+			ann.rad./ 0.4375(5)/100. 1.2270(5)/100. 1.5245(5)/100.
^{42}Sc		41.9655168	0.682 s	β^+ /6.4259	5.32/100.	0+			ann.rad./
^{43}Sc		42.961151	3.89 h	β^+ ,EC/2.221	0.82/22. 1.22/78.	7/2-	+4.62	-0.26	ann.rad./ 0.3729(1)/22.
^{44m}Sc			2.44 d	I.T./0.27 EC/3.926		6+	+3.88		0.27124(1)/87. (1.00-1.16)
^{44}Sc		43.959403	3.93 h	β^+, EC/3.653	1.47/	2+	+2.56	+0.10	ann.rad./ 1.15700(1)/100.
^{45}Sc	100.	44.955910				7/2-	+4.75649	-0.22	
^{46m}Sc			18.7 s	I.T./0.14253		1-			0.14253(2)/62.
^{46}Sc		45.955170	83.81 d	β- /2.367	0.357/100.	4+	+3.03	+0.12	0.88925(3)/100. 1.12051(1)/100.
^{47}Sc		46.952408	3.349 d	β- /0.600	0.439/69. 0.601/31.	7/2-	+5.34	-0.22	0.15938(1)/68.
^{48}Sc		47.95224	43.7 h	β- /3.99	0.655/	6+			0.98350(1)/100. 1.03750(1)/97. 1.31209(3)/100.
^{49}Sc		48.950024	57.3 m	β- /2.006	2.00/99.9.	7/2-			1.7619(3)/0.05
^{50}Sc		49.95219	1.71 m	β- /6.89	3.05/76. 3.60/24.	(5+)			0.5235(1)/88. 1.1210(1)/100. 1.5537(2)/100.
^{51}Sc		50.95360	12.4 s	β- /6.51	4.4/ 5.0/	7/2-			1.4373(4)/52. 0.718-2.144
^{52}Sc		51.9566	8.2 s	β- /9.0		(3+)			
^{53}Sc		52.9592	< 1.6 s	β- /8.1					
^{54}Sc		53.9630	≈0.23 s	β- /11.6					
^{55}Sc		54.967	0.13 s	β- /13					
^{56}Sc		55.973							
^{57}Sc		56.977							
^{58}Sc		57.983							
$_{22}$Ti		**47.867(1)**							
^{39}Ti		39.0013	28. ms	β^+ /15.4					
^{40}Ti		39.9905	52. ms	β^+ /11.7					
^{41}Ti		40.98313	80. ms	β^+ ,p/12.93		3/2+			ann.rad./
^{42}Ti		41.97303	0.20 s	β^+ /7.000	6.0/				ann.rad./ 0.6107(5)/56.
^{43}Ti		42.96852	0.50 s	β^+ /6.87	5.80/	7/2-	0.85		ann.rad./
^{44}Ti		43.959690	66. y	EC/0.268		0+			0.067868(1)/91. 0.078322(1)/97.
^{45}Ti		44.958124	3.078 h	β^+/86/2.062 EC/14/	1.04	7/2-	0.095	0.015	ann.rad./ (0.36-1.66)/weak
^{46}Ti	8.25(3)	45.952630				0+			
^{47}Ti	7.44(2)	46.951764				5/2-	-0.78848	+0.30	
^{48}Ti	73.72(3)	47.947947				0+			
^{49}Ti	5.41(2)	48.947871				7/2-	-1.10417	+0.24	

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Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{50}Ti	5.18(2)	49.944792				0+			
^{51}Ti		50.946616	5.76 m	β- /2.471	1.50/92. 2.13/	3/2-			0.3197(2)/93. 0.6094-0.9291
^{52}Ti		51.94690	1.7 m	β- /1.97	1.8/100.	0+			0.0170(5)/100. 0.12445(5)/100.
^{53}Ti		52.9497	33. s	β- /5.0	(2.2-3)/	3/2-			0.1008(1)/20. 0.1276(1)/45. 0.2284(1)/39. 1.6755(5)/45. (1.72-2.8)/
^{54}Ti		53.9509	1.5 s	β- /4.3					
^{55}Ti		54.9551	0.60 s	β- /7.4					
^{56}Ti		55.9580	0.15 s	β- /7.0					
^{57}Ti		56.963	$\approx$ 56. ms	β- /11.					
^{58}Ti		57.966							
^{59}Ti		58.972							
^{60}Ti		59.976							
^{61}Ti		60.982							
$_{23}$V		**50.9415(1)**							
^{43}V		42.9807	>0.8 s	β^+ /11.3					
^{44}V		43.9744	0.09 s	β^+ ,α/13.7					ann.rad./
^{45}V		44.96578	0.54 s	β^+ /7.13		7/2-			
^{46}V		45.960200	0.4223 s	β^+ /7.051	6.03/100.	0+			ann.rad./
^{47}V		46.954907	32.6 m	β^+ ,EC/2.928	1.90/99.+	3/2-			ann.rad./ 1.7949(8)/0.19 (0.2-2.16)
^{48}V		47.952254	15.98 d	β^+ /4.012	0.698/50.	4+	2.01		ann.rad./ 0.98350(2)/100. (1.3-2.4)
^{49}V		48.948517	337. d	EC/0.602		7/2-	4.47		
^{50}V	0.250(4)	49.947163	>1.4x10^{17}y	EC, β-		6+	+3.34569	+0.21	
^{51}V	99.750(4)	50.943964				7/2-	+5.148706	-0.04	
^{52}V		51.944780	3.76 m	β- /3.976	2.47/	3+			1.4341(1)/100.
^{53}V		52.944342	1.61 m	β- /3.436	2.52/	7/2-			1.0060(5)/90. 1.2891(3)/10.
^{54}V		53.94644	49.8 s	β- /7.04	1.00/5. 2.00/12. 2.95/45. 5.20/11.	3+			0.8348/97. 0.9887/80. 2.259/46. (0.56-3.38)
^{55}V		54.9472	6.5 s	β- /6.0	6.0/	(7/2-)			0.5177/73. (0.224-1.21)
^{56}V		55.9504	0.23 s	β- /9.1					
^{57}V		56.9524	0.33 s	β- /8.1					
^{58}V		57.9567	0.20 s	β- /11.6					
^{59}V		58.9593	0.07 s	β- /9.9					
^{60}V		59.965		β- /14.					
^{61}V		60.967							
^{62}V		61.973							
^{63}V		62.977							
^{64}V									
$_{24}$Cr		**51.9961(6)**							

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{43}Cr		42.9977	21. ms						
^{44}Cr		43.9855	53. ms	β^+ ,(p) /10.3	p/0.95-3.1				
^{45}Cr		44.9792	0.05 s	β^+ ,p/12.5		7/2-			ann.rad./
^{46}Cr		45.96836	0.3 s	β^+ /7.60					ann.rad./
^{47}Cr		46.96291	0.51 s	β^+ /7.45		3/2-			ann.rad./
^{48}Cr		47.95404	21.6 h	EC/1.66					ann.rad./ 0.116(2)/95. 0.305(10)/100.
^{49}Cr		48.951341	42.3 m	β^+,EC/2.631	1.39/ 1.45/ 1.54/	5/2-	0.476		ann.rad./ 0.09064(1)/51. 0.15293(1)/27. (0.062-1.6)
^{50}Cr	4.345(13)	49.946050				0+			
^{51}Cr		50.944772	27.70 d	EC/0.7527		7/2-	-0.934		0.320076(1)/10.2
^{52}Cr	83.789(18)	51.940512				0+			
^{53}Cr	9.501(17)	52.940653				3/2-	-0.47454	-0.15	
^{54}Cr	2.365(7)	53.938885				0+		-0.2	
^{55}Cr		54.940844	3.497 m	β- /2.603	2.5/	3/2-			1.5282(2)/0.04 (0.13-2.37)
^{56}Cr		55.94065	5.9 m	β- /1.62	1.50/100.	0+			0.026(2)/100. 0.083(3)/100.
^{57}Cr		56.9438	21. s	β- /5.1	3.3/ 3.5/	3/2-	0.0834		0.850/8. (0.083-2.62)
^{58}Cr		57.9443	7.0 s	β- /4.0					(0.131-0.683)
^{59}Cr		58.9487	1.0 s	β- /7.7					1.236
^{60}Cr		59.9497	0.6 s	β- /6.0					
^{61}Cr		60.9541		β- /8.8					
^{62}Cr		61.9558	0.20 s	β- /7.3					
^{63}Cr		62.962							
^{65}Cr		64.970							
^{66}Cr									
^{67}Cr									
$_{25}$Mn		**54.938049(9)**							
^{46}Mn		45.9867	≈41. ms	β^+ /17.1					
^{47}Mn		46.9761	≈0.1 s	β^+ /12.3					
^{48}Mn		47.9689	0.15 s	β^+ /13.5	5.79/58. 4.43/10.	4+			
^{49}Mn		48.95962	0.38 s	β^+ /7.72	6.69/	5/2-			ann.rad./
^{50m}Mn			1.74 m	β^+ /7.887	3.54/	5+			ann.rad./ 1.0980/94. 0.783/91. (0.66-3.11)
^{50}Mn		49.954244	0.283 s	β^+ /7.6330	6.61/	0+			ann.rad./
^{51}Mn		50.948215	46.2 m	β^+ ,EC/3.208	2.2/	5/2-	3.568	0.4	ann.rad./ 0.7491(1)/0.26 (1.148-1.164)
^{52m}Mn			21.1 m	β^+ /98/5.09 I.T./2/0.378	2.631/	2+	0.0076		ann.rad./ 0.3778 (I.T.) 1.43406(1)/98. (0.7-4.8)
^{52}Mn		51.945570	5.591 d	β^+ /4.712 EC/	0.575/	6+	+3.063	+0.5	ann.rad./ 0.74421(1)/90. 1.43406(1)/100.

TABLE OF THE ISOTOPES

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^{53}Mn		52.941294	3.7x10^{6} y	EC/0.5970		7/2-	5.024		
^{54}Mn		53.940363	312.1 d	EC/1.377		3+	+3.282	+0.33	0.83403(5)/100.
^{55}Mn	100.	54.938049				5/2-	+3.4687	+0.32	
^{56}Mn		55.938909	2.579 h	β- /3.6954	0.718/18. 1.028/34.	3+	+3.2266		0.84675(2)/98.9 1.81072(4)/27. 2.11305(5)/14.5
^{57}Mn		56.938287	1.45 m	β- /2.691		5/2-			
^{58}Mn		57.93999	65 s	β- /6.25	3.8/ 5.1/	3+			0.45916(2)/20. 0.81076(1)/82. 1.32309(5)/53.
^{59}Mn		58.94045	4.6 s	β- /5.19	4.5/				0.471/ 0.531-0.726
^{60m}Mn			1.77 s	β- /IT	5.7/	3+			0.824/
^{60}Mn		59.9433	50. s	β- /8.6		0+			1.969/
^{61}Mn		60.9446	0.71 s	β- /7.4		(5/2)-			
^{62}Mn		61.9480	0.9 s	β- /10.4		(3+)			0.877/ 0.942-1.299
^{63}Mn		62.9498	0.25 s	β- /8.8					0.356
^{64}Mn		63.9537	0.17 s	β- /11.8					
^{65}Mn		64.9561		β- /10.					
^{66}Mn		65.961							
^{67}Mn		66.964							
^{68}Mn									
^{69}Mn									
$_{26}$Fe		**55.845(2)**							
^{45}Fe		45.0146							
^{46}Fe		46.0008	≈0.02 s	β^+ /13.1					
^{47}Fe		46.9929	≈0.03 s	β^+ /15.6					
^{48}Fe		47.9806	≈ 44. ms	β^+ /11.2					
^{49}Fe		48.9763	70. ms	β^+ /13.0		(7/2-)			ann.rad./ 0.651
^{50}Fe		49.9630	0.15 s	β^+ /8.2					
^{51}Fe		50.95683	0.31 s	β^+ /8.02		(5/2-)			ann.rad./
^{52m}Fe			46. s	β^+ /4.4		(12+)			ann.rad./ (0.622-2.286)/
^{52}Fe		51.94812	8.28 h	β^+ /57/2.37 EC/43/ I.T./	0.804/	0+			ann.rad./ 0.16868(1)/99. 0.377 (I.T.)/
^{53m}Fe			2.6 m	I.T./3.0407		19/2-			0.7011(1)/99. 1.0115(1)/87. 1.3281(1)/87. 2.3396(1)/13.
^{53}Fe		52.945312	8.51 m	β^+ /3.743	2.40/42. 2.80/57.	7/2-			ann.rad./ 0.3779(1)/42. (1.2-3.2)
^{54}Fe	5.845(35)	53.939615				0+			
^{55}Fe		54.938298	2.73 y	EC/0.2314		3/2-			
^{56}Fe	91.754(36)	55.934942				0+			
^{57}Fe	2.119(10)	56.935398				1/2-	+0.0906	0.16	
^{58}Fe	0.282(4)	57.933280				0+			
^{59}Fe		58.934880	44.51 d	β- /1.565	0.273/48. 0.475/51.	3/2-	- 0.336		1.099/57 1.292/43. (0.14-1.48)
^{60}Fe		59.934077	1.5x10^{6} y	β- /0.237	0.184/100.	0+			0.0586/100.(IT)

TABLE OF THE ISOTOPES

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^{61}Fe		60.93675	6.0 m	β- /3.98	2.5/13. 2.63/54. 2.80/31.				1.205/44. 1.028/43. (0.12-3.37)
^{62}Fe		61.93677	68. s	β- /2.53	2.5/100.	0+			0.5061(1)/100.
^{63}Fe		62.9404	6. s	β- /6.3		5/2-			0.995/ (1.365-1.427)
^{64}Fe		63.9411	2.0 s	β- /4.9					
^{65}Fe		64.9449	≈0.45 s	β- /7.9					
^{66}Fe		65.9460		β- /5.7					
^{67}Fe		66.9500		β- /8.8					
^{68}Fe		67.953	≈0.10 s	β- /≈7.6					
^{69}Fe		68.958							
^{70}Fe									
^{71}Fe									
^{72}Fe									
$_{27}$Co		**58.933200(9)**							
^{50}Co		49.9812	44. ms	β^+ /17.0	2.03-2.79				
^{51}Co		50.9705		β^+ /12.8					
^{52}Co		51.9632	0.12 s	β^+ /14.0					0.849-1.942
^{53m}Co			0.25 s	β^+ ,p/		19/2-			ann.rad./
^{53}Co		52.95423	0.26 s	β^+ /8.30		7/2-			ann.rad./
^{54m}Co			1.46 m	β^+ /8.44	4.25/100.	7+			ann.rad./ 0.411(1)/99. 1.130(1)/100. 1.408(1)/100.
^{54}Co		53.948464	0.1932 s	β^+ /8.2430	7.34/100.	0+			ann.rad./
^{55}Co		54.942003	17.53 h	β^+ /3.4513 EC/	0.53/ 1.03/ 1.50/	7/2-	+4.822		ann.rad./ 0.9312/75. 0.4772/20. (0.092-3.11)
^{56}Co		55.939844	77.3 d	β^+ /4.566 EC/	1.459/18.	4+	3.85	+0.25	ann.rad./ 0.84678(6)/99.9 1.2383/68. (0.26-3.61)
^{57}Co		56.936296	271.8 d	EC/0.8361		7/2-	+4.72	+0.5	0.12206(2)/85.6 (0.014-0.706)
^{58m}Co			9.1 h	I.T./		5+			0.02489/0.035
^{58}Co		57.935757	70.88 d	β^+ /2.307 EC/		2+	+4.04	+0.22	ann.rad./ 0.810755(3)/99.
^{59}Co	100.	58.933200				7/2-	+4.63	+0.41	
^{60m}Co			10.47 m	I.T./99.8/0.059 β- /0.2/1.56		2+	+4.40	+0.3	0.058603(1)/2.0
^{60}Co		59.933822	5.271 y	β- /2.824	0.315/99.7	5+	+3.799	+0.44	1.173210(2)/100. 1.332470(2)/100.
^{61}Co		60.932479	1.650 h	β- /1.322	1.22/95.	7/2-			0.067415(1)/86. (0.8417-0.9092)
^{62m}Co			13.9 m	β- /	0.88/25. 2.88/75.	5+			1.1635(3)/70. 1.1730(3)/98. 2.0039(3)/19.
^{62}Co		61.93405	1.50 m	β- /5.32	1.03/10. 1.76/5. 2.9/20. 4.05/60.	2+			1.1292(3)/13. 1.1730(3)/83. 1.9851(1)/3. 2.3020(1)/19.

TABLE OF THE ISOTOPES

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^{63}Co		62.93362	27.5 s	β- /3.67	3.6/	7/2-			0.08713(1)/49. 0.9817(3)/2.6 0.156-2.17
^{64}Co		63.93581	0.30 s	β- /7.31	7.0/	1+			
^{65}Co		64.93648	1.14 s	β- /5.96		(7/2)-			
^{66}Co		65.9398	0.25 s	β- /10.0					(1.245-1.425)
^{67}Co		66.9406	0.32 s	β- /8.4					0.694
^{68}Co		67.9444	$\approx$ 0.18 s	β- /11.7					
^{69}Co		68.9452	0.27 s	β- /9.3					
^{70}Co		69.950	0.17 s	β- 13.					
^{71}Co		70.952	0.20 s	β					
^{72}Co		71.956	0.12 s	β					
^{73}Co									
^{74}Co									
^{75}Co									
$_{28}$Ni		**58.6934(2)**							
^{49}Ni									
^{50}Ni		49.9959							
^{51}Ni		50.9877		β^+ /16.0					
^{52}Ni		51.9757	38. ms	β^+ /11.7					
^{53}Ni		52.9685	0.05 s	β^+ ,p/13.3		7/2-			ann.rad./
^{54}Ni		53.95791	0.14 s	β^+ /8.80					0.937
^{55}Ni		54.95134	0.20 s	β^+ /8.70	7.66/	7/2-			ann.rad./
^{56}Ni		55.94214	6.08 d	EC/2.14		0+			0.15838(3)/98.8 0.81185(3)/87. 0.2695-0.7500
^{57}Ni		56.939800	35.6 h	β^+ /3.264 EC/	0.712/10. 0.849/76.	3/2-	- 0.798		ann.rad./ 1.3776/78. (0.127-3.177)
^{58}Ni	68.0769(89)	57.935348				0+			
^{59}Ni		58.934351	$\approx 7.6 \times 10^4$ y	EC/		3/2-			
^{60}Ni	26.2231(77)	59.930790				0+			
^{61}Ni	1.1399(6)	60.931060				3/2-	-0.75002	+0.16	
^{62}Ni	3.6345(17)	61.928348				0+			
^{63}Ni		62.929673	100. y	β- /0.066945	0.065/	1/2-			
^{64}Ni	0.9256(9)	63.927969				0+			
^{65}Ni		64.930088	2.517 h	β- /2.137	0.65/30. 1.020/11. 2.140/58.	5/2-	0.69		0.36627(3)/5. 1.11553(4)/16. 1.48184(5)/23.
^{66}Ni		65.92912	54.6 h	β- /0.23		0+			
^{67}Ni		66.93157	21. s	β- /3.56	3.8/	1/2-			1.0722/100. 1.6539/100. (0.10-1.98)
^{68}Ni		67.93185	19. s	β- /2.06					
^{69}Ni		68.9352	10. s	β- /5.4					0.6807(3)/100. (0.207-1.213)
^{70}Ni		69.9361		β- /3.5					
^{71}Ni		70.9400	1.9 s	β- /6.9					
^{72}Ni		71.9413	2.1 s	β- /5.2					
^{73}Ni		72.946	0.9 s	β- /9.					
^{74}Ni		73.948	1.1 s	β- /7.					
^{75}Ni		74.953	$\approx$ 0.47 s						
^{76}Ni		75.955	$\approx$ 0.24 s						

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^{77}Ni		76.961							
^{78}Ni		77.964							
$_{29}$Cu		**63.546(3)**							
^{55}Cu		54.9655		β^+ /13.2					
^{56}Cu		55.9586		β^+ /15.3					
^{57}Cu		56.94922	196. ms	β^+ /8.77		3/2-			0.77-3.01
^{58}Cu		57.944541	3.21 s	β^+ /8.563 EC/	4.5/15. 7.439/83.	1+			ann.rad./ 0.0403(4)/5. 1.4483(2)/11. 1.4546(2)/16.
^{59}Cu		58.939504	1.36 m	β^+ /4.800	1.9/ 3.75/	3/2-			ann.rad./ 0.3393(1)/8. 0.8780(1)/12. 1.3015(1)/15. (0.4-2.6)
^{60}Cu		59.937368	23.7 m	β^+ /6.127 EC/	2.00/69. 3.00/18. 3.92/6.	2+	+1.219		ann.rad./ 1.3325/88. 1.7915/45. (0.12-5.048)
^{61}Cu		60.933462	3.35 h	β^+ /2.237	0.56/3. 0.94/5. 1.15/2. 1.220/51.	3/2-	+2.14		ann.rad./ 0.2830/13. 0.6560/11. (0.067-2.123)
^{62}Cu		61.932587	9.67 m	β^+ /98/3.948 EC/	2.93/98.	1+	-0.380		ann.rad./ 1.17302(1)/0.6 (0.87-3.37)
^{63}Cu	69.17(3)	62.929601				3/2-	+2.2233	-0.211	
^{64}Cu		63.929768	12.701 h	β- /39/0.579 β^+ /19/1.6751 EC/41/	0.578/ 0.65/	1+	-0.217		ann.rad./ 1.3459(3)/0.6
^{65}Cu	30.83(3)	64.927794				3/2-	+2.3817	-0.195	
^{66}Cu		65.928873	5.09 m	β- /2.642	1.65/6. 2.7/94.	1+	-0.282		0.8330(1)/0.22 1.0392(2)/9.2
^{67}Cu		66.92775	2.580 d	β- /0.58	0.395/56. 0.484/23. 0.577/20.	3/2-			0.09125(1)/7. 0.09325(1)/17. 0.18453(1)/47.
^{68m}Cu			3.79 m	I.T./86/ β- /14/1.8		6-			0.0843(5)/70. 0.1112(5)/18. 0.5259(5)/74. (0.64-1.34)
^{68}Cu		67.92964	31. s	β- /4.46	3.5/40. 4.6/31.	1+			1.0774(5)/58. 1.2613(5)/17. (0.15-2.34)
^{69}Cu		68.92943	2.8 m	β- /2.68	2.48/80.	3/2-			0.5307(3)/3. 0.8340(5)/6. 1.0065(8)/10.
^{70m}Cu			47. s	β- /	2.52/10.	5-			0.8848(2)/100. 0.9017(2)/90. 1.2517(5)/60. (0.39-3.06)
^{70}Cu		69.93241	5. s	β- /6.60	5.42/54. 6.09/46.	1+			0.8848(2)/54.
^{71}Cu		70.93262	20. s	β- /4.56		3/2-			0.490/

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^{72}Cu		71.9357	6.6 s	β- /8.2		(1+)			0.652/
^{73}Cu		72.9365	3.9 s	β- /6.3					0.450/
^{74}Cu		73.9401	1.6 s	β- /9.9					
^{75}Cu		74.9414	1.2 s	β- /7.9					
^{76}Cu		75.9455	0.64 s	β- /11.					
^{77}Cu		76.947	0.47 s	β- /≈10.					
^{78}Cu		77.952	0.34 s	β- /12.					
^{79}Cu		78.954	0.19 s	β- /11.					
^{80}Cu		79.962							
$_{30}$Zn		**65.39(2)**							
^{57}Zn		56.9649	0.04 s	β^+,p/14.6		(7/2-)			ann.rad./
^{59}Zn		58.94927	183. ms	β^+,p/9.09	8.1/	3/2-			ann.rad./ (0.491-0.914)
^{60}Zn		59.94183	2.40 m	β^+ /97/4.16 EC/3/		0+			ann.rad./ 0.669/47. (0.062-0.947)
^{61}Zn		60.93951	1.485 m	β^+ /5.64	4.38/68.	3/2-			ann.rad./ 0.4748/17. (0.15-3.52)
^{62}Zn		61.93433	9.22 h	β^+ /3/1.63 EC/93/	0.66/7.	0+			ann.rad./ 0.0408/25 0.5967/26. (0.20-1.526)/
^{63}Zn		62.933215	38.5 m	β^+ /93/3.367 EC/7/	1.02/ 1.40/ 1.71/ 2.36/84.	3/2-	-0.28164	+0.29	ann.rad./ 0.66962(5)/8.4 0.96206(5)/6.6 (0.24-3.1)
^{64}Zn	48.63(60)	63.929146				0+			
^{65}Zn		64.929245	243.8 d	β^+ /98/1.3514 EC/1.5/	0.325/	5/2-	+0.7690	-0.023	ann.rad./ 1.11552(2)/50.8
^{66}Zn	27.90(27)	65.926036				0+			
^{67}Zn	4.10(13)	66.927131				5/2-	+0.8755	+0.15	
^{68}Zn	18.75(51)	67.924847				0+			
^{69m}Zn			13.76 h	I.T./99+/0.439		9/2+			0.4390(2)/95.
^{69}Zn		68.926553	56. m	β- /0.906	0.905/99.9	1/2-			0.318/
^{70}Zn	0.62(3)	69.925325				0+			
^{71m}Zn			3.97 h	β- /	1.45/	9/2+			0.3864/93. 0.4874/62. 0.6203/57. (0.099-2.489)
^{71}Zn		70.92773	2.4 m	β- /2.81		1/2-			0.5116(1)/30. 0.9103(1)/7.5 (0.12-2.29)
^{72}Zn		71.92686	46.5 h	β- /0.46	0.25/14. 0.30/86.	0+			0.0164(3)/8. 0.1447(1)/83. 0.1915(2)/9.4
^{73m}Zn			6. s		I.T./0.196	(7/2+)			0.042
^{73}Zn		72.92978	24. s	β- /4.29	4.7/	(1/2-)			0.216(1)/100. 0.496-0.911
^{74}Zn		73.92946	1.60 m	β- /2.3	2.1/				0.0565/ 0.1401/ (0.05-0.35)
^{75}Zn		74.9329	10.2 s	β- /6.0					0.229/

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{76}Zn		75.9334	5.7 s	β- /4.2	3.6/				0.119/
^{77m}Zn			1.0 s	β- /		(1/2-)			0.772
^{77}Zn		76.9371	2.1 s	β- /7.3	4.8/				0.189/
^{78}Zn		77.9386	1.5 s	β- /6.4					0.225/
^{79}Zn		78.9421	1.0 s	β- /8.6					0.702/
^{80}Zn		79.9444	0.54 s	β- /7.3					0.713/
									0.2248/
^{81}Zn		80.9505	0.29 s	β- /11.9					
^{82}Zn		81.9548							
^{83}Zn									
$_{31}$Ga		**69.723(1)**							
^{60}Ga		59.9571							
^{61}Ga		60.9492	0.15 s	β^+ /9.0					
^{62}Ga		61.94418	0.116 s	β^+ /9.17	8.3/	0+			ann.rad./
				EC/					
^{63}Ga		62.9391	32. s	β^+ /5.5	4.5/				ann.rad./
				EC/					0.6271(2)/10.
									0.6370(2)/11.
									1.0652(4)/45.
^{64}Ga		63.936838	2.63 m	β^+ /7.165	2.79/	0+			ann.rad./
					6.05/				0.80785(1)/14.
									0.99152(1)/43.
									1.38727(1)/12.
									3.3659(1)/13.
^{65}Ga		64.9394	15.2 m	β^+ /86/3.255	0.82/10.	3/2-			ann.rad./
				EC/	1.39/19.				0.1151(2)/55.
					2.113/56.				0.1530(2)/96.
					2.237/15.				0.2069(2)/39.
									(0.06-2.4)
^{66}Ga		65.931592	9.5 h	β^+ /56/5.175	0.74/1.	0+			ann.rad./
				EC/43/	1.84/54.				1.03935(8)/38.
					4.153/51.				2.7523(1)/23.
									(0.28-5.01)
^{67}Ga		66.928205	3.260 d	EC/1.001		3/2-	+1.8507	0.20	0.09332/37.
									0.18459/20.
									0.30024/17.
									(0.091-0.89)
^{68}Ga		67.927983	1.130 h	β^+ /90/2.921	1.83/	1+	0.01175	0.028	ann.rad./
				EC/10/					1.0774(1)/3.
									(0.57-2.33)/
^{69}Ga	60.108(9)	68.925581				3/2-	+2.01659	+0.17	
^{70}Ga		69.926027	21.1 m	EC/0.2/0.655		1+			0.1755(5)/0.15
				β- /99.8/1.656	1.65/99.				1.042(5)/0.48
^{71}Ga	39.892(9)	70.924707				3/2-	+2.56227	+0.11	
^{72}Ga		71.926372	14.10 h	β- /4.001	0.64/40.	3-	-0.13224	+0.5	0.62986(5)/24.
					1.51/9.				2.2016(2)/26.
					2.52/8.				2.5077(2)/12.8
					3.15/11.				(0.11-3.3)/
^{73}Ga		72.92517	74.87 h	β- /1.59		3/2-			0.05344(5)/10.
									0.29732(5)/47.
									(0.01-1.00)/
^{74m}Ga			10. s	I.T./		1+			0.0565(1)/75.
^{74}Ga		73.92694	8.1 m	β- /5.4	2.6/	3-			0.5959/92.

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									2.354/45.
									(0.23-3.99)
^{75}Ga		74.92650	2.10 m	β- /3.39	3.3/	3/2-			0.2529/
									0.5746/
									(0.12-2.10)
^{76}Ga		75.9289	29. s	β- /7.0		3-			0.5629/66.
									0.5455/26.
									(0.34-4.25)
^{77}Ga		76.9293	13.0 s	β- /5.3	5.2/				0.469/
									0.459/
^{78}Ga		77.9317	5.09 s	β- /8.2		3+			0.619/77.
									1.187/20.
^{79}Ga		78.9329	2.85 s	β- /7.0	4.6/				0.465/
^{80}Ga		79.9366	1.68 s	β- /10.4	10./				0.659/
^{81}Ga		80.9377	1.22 s	β- /8.3	5.1/				0.217/
^{82}Ga		81.9432	0.599 s	β- /12.6					1.348/
^{83}Ga		82.9469	0.308 s	β- /≈ 11.5					
^{84}Ga		83.952	≈0.085 s	β- /14					
^{85}Ga									
^{86}Ga									
$_{32}$Ge		**72.61(2)**							
^{61}Ge		60.9638	0.04 s	β^+ /13.6					
^{63}Ge		62.9496	0.10 s	β- /9.8					
^{64}Ge		63.9416	1.06 m	β^+ /4.4	3.0/	0+			ann.rad./
				EC/					0.1282(2)/11.
									0.4270(3)/37.
									0.6671(3)/17.
^{65}Ge		64.9394	31. s	β^+ /6.2	0.82/10.				ann.rad./
				EC/	1.39/19.				0.0620/27.
					2.113/56.				0.6497/33.
					2.237/15.				0.8091/21.
									(0.19-3.28)
^{66}Ge		65.93385	2.26 h	β^+ /27/2.10		0+			ann.rad./
				EC/73/					0.0438/29.
									0.3819/28.
									(0.022-1.77)
^{67}Ge		66.932738	19.0 m	β^+ /96/4.225	1.6/	1/2-			ann.rad./
				EC/4/	2.3/				0.1670/84.
					3.15/				(0.25-3.73)
^{68}Ge		67.92810	270.8 d	EC/0.11		0+			Ga k x-ray/39.
^{69}Ge		68.927973	1.63 d	β^+ /36/2.2273	0.70/	5/2-	0.735	0.02	ann.rad./
				EC/64/	1.2/				0.574/13.
									1.1068/36.
									(0.2-2.04)
^{70}Ge	20.84(87)	69.924250				0+			
^{71m}Ge			20.4 ms		I.T./0.0234	9/2+			0.1749
^{71}Ge		70.924954	11.2 d	EC/0.229		1/2-	+0.547		
^{72}Ge	27.54(34)	71.922076				0+			
^{73}Ge	7.73(5)	72.923460				9/2+	-0.879467	-0.17	
^{74}Ge	36.28(73)	73.921178				0+			
^{75m}Ge			48. s	I.T./		7/2+			0.13968(3)/39.
^{75}Ge		74.922860	1.380 h	β- /1.177	1.19/	1/2-	+0.510		0.26461(5)/11.
									0.41931(5)/0.2

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{76}Ge	7.61(38)	75.921403				0+			
^{77m}Ge			53. s	I.T./20/ β- /80/2.861	2.9/	1/2-			0.1597(1)/11. 0.21551/21. (0.19-0.61)
^{77}Ge		76.923549	11.25 h	β- /2.702	0.71/23. 1.38/35. 2.19/42.	7/2+			0.2110/29. 0.2155/27. 0.2644/51. (0.15-2.35)
^{78}Ge		77.922853	1.45 h	β- /0.95	0.70/	0+			0.2773(5)/96. 0.2939(5)/4.
^{79m}Ge			39. s	β- /IT		7/2+			
^{79}Ge		78.9254	19.1 s	β- /4.2	4.0/20. 4.3/80.	1/2-			0.1096/21. (0.10-2.59)
^{80}Ge		79.92545	29.5 s	β- /2.67	2.4/	0+			0.5427(4)/15. 0.1104(4)/6. 0.2656(4)/25.
^{81m}Ge			≈7.6 s	β- /	3.75/	1/2+			0.3362(4)/ 0.7935(4)/
^{81}Ge		80.9288	≈7.6 s	β- /6.2	3.44/	9/2+			0.1976(4)/21. 0.3362(4)/100.
^{82}Ge		81.9296	4.6 s	β- /4.7		0+			1.093/
^{83}Ge		82.9345	1.9 s	β- /8.9					
^{84}Ge		83.9373	0.98 s	β- /7.7					
^{85}Ge		84.943	0.54 s	β- /10.					
^{86}Ge		85.946							
^{87}Ge									
^{88}Ge									
^{89}Ge									
$_{33}$As		**74.92160(2)**							
^{64}As		63.9576							
^{65}As		64.9495	0.19 s	β^+ /9.4					
^{66}As		65.94410	95.8 ms	β^+ /9.55					
^{67}As		66.9392	42. s	β^+ /6.0 EC/	5.0/	5/2-			0.121/ 0.123/ 0.244/
^{68}As		67.9368	2.53 m	β^+ /8.1		3+			ann.rad./ 0.652/32. 0.762/33. 1.016/77. (0.61-3.55)
^{69}As		68.93228	15.2 m	β^+ /98/4.01 EC/2/	2.95/	5/2-	1.2		ann.rad./ 0.0868(5)/1.5 0.1458(3)/2.4
^{70}As		69.93093	52.6 m	β^+ /84/6.22 EC/16/2.14 /2.89	1.44/	4+	+2.1061	+0.09	ann.rad./ 1.0395(7)/82. (0.17-4.4)/
^{71}As		70.927114	2.72 d	β^+ /32/2.013 EC/68/		5/2-	+1.6735	-0.02	ann.rad./ 0.1749(2)/84. 1.0957(2)/4.2
^{72}As		71.926753	26.0 h	β^+ /77/4.356	0.669/5. 1.884/12. 2.498/62. 3.339/19.	2-	-2.1566	-0.08	ann.rad./ 0.83395(5)/80. 1.0507(1)/9.6 (0.1-4.0)

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{73}As		72.923825	80.3 d	EC/0.341		3/2-			0.013263(1)/0.1 0.053437(1)/10.5 Se k x-ray/90.
^{74}As		73.923829	17.78 d	β^+ /31/2.562 EC/37/ β- /1.353	0.94/26. 1.53/3. 0.71/16. 1.35/16.	2-	-1.597		ann.rad./ 0.59588(1)/60. 0.6084(1)/0.6 0.6348(1)/15.
^{75}As	100.	74.921597				3/2-	+1.43947	+0.31	
^{76}As		75.922394	26.3 h	β- /2.962	0.54/3. 1.785/8. 2.410/36. 2.97/51.	2-	-0.906		0.5591(1)/45. 0.65703(5)/6.2 1.21602(1)/3.4 (0.3-2.67)
^{77}As		76.920648	38.8 h	β- /0.683	0.70/98.	3/2-			0.2391(2)/1.6 0.2500(3)/0.4 0.52078(1)/0.43
^{78}As		77.92183	1.512 h	β- /4.21	3.00/12. 3.70/17. 4.42/37.	2-			0.6136(3)/54. 0.6954(3)/18. 1.3088(3)/10.
^{79}As		78.92095	9.0 m	β- /2.28	1.80/95.	3/2-			0.0955(5)/16. 0.3645(5)/1.9
^{80}As		79.92258	16. s	β- /5.64	3.38/	1+			0.6662(2)/42. (2.5-3.0)
^{81}As		80.92213	33. s	β- /3.856		3/2-			0.4676(2)/20. 0.4911(2)/8.
^{82m}As			13.7 s	β- /	3.6/	5-			0.6544(1)/72. 0.8186(4)/27. 1.7313(2)/27. 1.8954(2)/38.
^{82}As		81.9246	19. s	β- /7.4	7.2/80.	1+			0.6544(1)/15.
^{83}As		82.9250	13.4 s	β- /5.5					0.7345/100. 1.1131/34. 2.0767/28.
^{84m}As			0.6 s	β-					
^{84}As		83.9291	4. s	β-, n/7.2		1-			0.6671(2)/21. 1.4439(5)/49. (0.325-5.150)
^{85}As		84.9318	2.03 s	β-, n/8.9		3/2-			0.667(1)/42. 1.4551(2)/100.
^{86}As		85.9362	0.95 s	β-, n/11.4					0.704/
^{87}As		86.9396	0.49 s	β-, n/10.					0.704/
^{88}As		87.945							
^{89}As		88.949							
^{90}As									
^{91}As									
^{92}As									
$_{34}$Se		**78.96(3)**							
^{65}Se		64.965	0.011 s	β^+ /60/14. β^+, p	3.55/				
^{66}Se		65.9552							
^{67}Se		66.9501	0.06 s	β^+ /10.2 β^+ ,(p)/					ann.rad./ 0.352
^{68}Se		67.9419	36. s	β^+ /4.7					ann.rad./ (0.050-0.426)

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{69}Se		68.93956	27.4 s	β^+ /6.78 EC/	5.006/				ann.rad./ 0.0664(4)/27. 0.0982(4)/63.
^{70}Se		69.9335	41.1 m	β^+ /2.4		0+			ann.rad 0.04951(5)/35. 0.4262(2)/29.
^{71}Se		70.9319	4.7 m	β^+ /4.4 EC/	3.4/36.	5/2-			ann.rad 0.1472(3)/47. 0.8309(3)/13. 1.0960(3)/10.
^{72}Se		71.92711	8.5 d	EC/0.34		0+			0.0460(2)/57.
^{73m}Se			40. m	I.T./73/0.0257 β^+ /27/2.77	0.85 1.45/ 1.70/	3/2-			ann.rad. 0.0257(2)/27. 0.2538(1)/2.5
^{73}Se		72.92678	7.1 h	β^+ /65/2.74 EC/35/	0.80/ 1.32/95. 1.68/1.	9/2+			ann.rad 0.0670(1)/72. 0.3609(1)/97. (0.6-1.5)
^{74}Se	0.89(4)	73.922477				0+			
^{75}Se		74.922524	119.78 d	EC/0.864		5/2+	0.67	1.0	0.136000(1)/55. 0.264651(1)/58. (0.024-0.821)
^{76}Se	9.37(29)	75.919214				0+			
^{77m}Se			17.4 s	I.T./		7/2+			0.1619(2)/52.
^{77}Se	7.63(16)	76.919915				1/2-	+0.53506		
^{78}Se	23.77(28)	77.917310				0+			
^{79m}Se			3.92 m	I.T./					0.09573(3)/9.5
^{79}Se		78.918500	$1.1x10^6$ y	β-/0.151		7/2+	-1.018	+0.8	
^{80}Se	49.61(41)	79.916522				0+			
^{81m}Se			57.3 m	I.T./99/0.1031		7/2+			0.1031(3)/9.7 0.2602(2)/0.06 0.27599(1)/0.06
^{81}Se		80.917993	18.5 m	β-/1.585	1.6/98.	1/2-			0.27594(5)/0.85 0.29008(5)/0.75 0.82827(5)/0.32
^{82}Se	8.73(22)	81.916700				0+			
^{83m}Se			1.17 m	β- /3.96	2.88/ 3.92/	1/2-			0.35666(6)/17. 0.9879(1)/15. 1.0305(1)/21. 2.0514(2)/11. (0.19-3.1)
^{83}Se		82.919119	22.3 m	β- /3.668	0.93/ 1.51/	9/2+			0.22516(6)/33. 0.35666(6)/69. 0.51004(8)/45. (0.21-2.42)
^{84}Se		83.91847	3.3 m	β- /1.83	1.41/100.	0+			0.4088(5)/100.
^{85}Se		84.92225	32. s	β- /6.18	5.9/	5/2+			0.3450(1)/22. 0.6094(1)/41.
^{86}Se		85.92428	15. s	β- /5.10		5/2+			2.0124(1)/24. 2.4433(8)/100. 2.6619(1)/49.
^{87}Se		86.92853	5.4 s	β- /7.28 n/					0.468(1)/100. 1.4979(1)/23.
^{88}Se		87.93143	1.5 s	β- ,n/6.85					0.5346/
^{89}Se		88.9360	0.41s	β- ,n/9.0					

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^{90}Se		89.9394							
^{91}Se		90.945	0.27 s	β- ,n/8.					
^{92}Se		91.949							
^{93}Se									
^{94}Se									
$_{35}$Br		**79.904(1)**							
^{69}Br		68.9502		β^+ /9.6					
^{70}Br		69.9446	79. ms	β^+ /10.0					
^{71}Br		70.9392	21. s	β^+ /6.9					
^{72}Br		71.9365	1.31 m	β^+ /8.7		3	≈0.55		0.4547-1.3167
^{73}Br		72.9318	3.4 m	β^+ /4.7	3.7/	3/2-			ann.rad (0.0649-0.6995)
^{74m}Br			46. m	β^+ /	4.5/	4-	1.8		ann.rad 0.6348 0.7285 (0.2-4.38)
^{74}Br		73.92989	25.4 m	β^+ /6.91					ann.rad 0.6341 0.6348 (0.2-4.7)
^{75}Br		74.92578	1.62	β^+ /76/3.03		3/2-	0.75(11)		ann.rad 0.28650 (0.1-1.56)
^{76m}Br			1.4 s	I.T./5.05		4+			0.104548 0.05711
^{76}Br		75.92454	16.0 h	β^+ /57 /4.96	1.9/ 3.68/	1-	0.54821	0.270	ann.rad 0.55911 1.85368 (0.4-4.6)
^{77m}Br			4.3 m	I.T./0.1059		9/2+	0.97		0.1059
^{77}Br		76.921380	2.376 d	EC/99 /1.365		3/2-			ann.rad. 0.23898 0.52069 (0.08-1.2)
^{78}Br		77.921146	6.45 m	β^+ /92/3.574 EC/8 /	1.2/ 2.5/	1+	0.1		ann.rad. 0.61363 (0.7-3.0)
^{79m}Br			4.86 s	I.T./0.207		9/2+	+2.106		0.2072
^{79}Br	50.69(7)	78.918338				3/2-	+2.106400	+0.331	
^{80m}Br			4.42 h	I.T./0.04885		5-	+1.3177		Br k x-ray 0.03705/39.1 0.04885/0.3
^{80}Br		79.918530	17.66 m	β^- /92 /2.004 EC/5.7/1.8706 β^+ /2.6/	1.38 β- /7.6 1.99 β- /82 0.85 β^+ /2.8	1+	0.5140	0.196	ann.rad. 0.6169/6.7 (0.64-1.45)
^{81}Br	49.31(7)	80.916291				3/2-	+2.270562	+0.276	
^{82m}Br			6.1 m	I.T./98/0.046 β- /2 /3.139		2-			0.046/0.24 (0.62-2.66)
^{82}Br		81.916805	1.471 d	β- /3.093	0.444/	5-	+1.6270	0.751	0.5544/71 0.61905/43 0.77649/84 (0.013-1.96)
^{83}Br		82.915181	2.40 h	β- /0.972	0.395/1	3/2-			0.52964

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{84m}Br			6.0 m	β- /4.97	0.925/99 2.2/100	(6-)			(0.12-0.68) 0.4240/100 0.8817/98 1.4637/101
^{84}Br		83.91651	31.8 m	β- /4.65	2.70/11 3.81/20 4.63/34	2-	2.		0.8816/41 1.8976/13 (0.23-4.12)
^{85}Br		84.91561	2.87 m	β- /2.87	2.57	3/2-			0.80241/2.56 0.92463/1.6 (0.09-2.4)
^{86}Br		85.91880	55.5 s	β- /7.63	3.3 7.4	(2-)			1.56460/64 2.75106/21 (0.5-6.8)
^{87}Br		86.92072	55.6 s	β- /6.85 n/	6.1/	3/2-			1.41983 1.4762 (0.2-6.1)
^{88}Br		87.92407	16.3 s	β- /8.96 n/		1-			0.7649 0.7753 0.8021 (0.1-6.99)
^{89}Br		88.92640	4.35 s	β- /8.16 n/		3/2-			0.7753 1.0978
^{90}Br		89.9306	1.91 s	β- /10.4 n/	8.3/ 9.8/	2-			0.6555 0.7071 1.3626
^{91}Br		90.9339	0.54 s	β- /90 /9.80 β- n/10 /					0.263 0.803
^{92}Br		91.9392	0.31 s	β- /12.20 β- n/					0.740
^{93}Br		92.9431	0.10 s	β- n/11.1					
^{94}Br		93.9487	0.07 s	β- n/					
^{95}Br									
^{96}Br									
^{97}Br									
$_{36}$Kr		**83.80(1)**							
^{69}Kr		68.9653	0.03 s	β^+,(p)	4.07/				
^{70}Kr		69.9560							
^{71}Kr		70.9505	100. ms	β^+ ,EC/10.1					(0.198-0.207)
^{72}Kr		71.9419	17. s	β^+ /5.0 EC/		0+			ann.rad 0.3100/29 0.4150/36 (0.12-0.58)
^{73}Kr		72.9389	27. s	β^+ /6.7 EC/ β^+ ,p/		5/2-			ann.rad. 0.1781/66 (0.06-0.86)
^{74}Kr		73.9333	11.5 m	β^+ /3.1 EC/		0+			ann.rad. 0.08970/31 0.2030/20 (0.010-1.06)
^{75}Kr		74.93104	4.3 m	β^+ /4.90 EC/	3.2/		- 0.531	+ 1.1	ann.rad. 0.1325/68 0.1547/21

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{76}Kr		75.92595	14.8 h	EC/1.31		0+			(0.02-1.7) Br k x-ray 0.270/21 0.3158/39
^{77}Kr		76.92467	1.24 h	β^+ /80 /3.06 EC/20 /	1.55/ 1.70/ 1.87/	5/2+	- 0.583	+ 0.9	(0.03-1.07) ann.rad. 0.1297/80 0.1465/38 (0.02-2.3)
^{78}Kr	0.35(1)	77.92039				0+			
^{79m}Kr			53. s	I.T./0.1299		7/2+	- 0.786	+ 0.40	Kr x-ray
^{79}Kr		78.920083	1.455 d	β^+ /7 /1.626 EC/93 /		1/2-	+ 0.536		ann.rad. 0.2613/13 0.39756/19 0.6061/8 (0.04-1.3)
^{80}Kr	2.28(6)	79.916379				0+			
^{81m}Kr			13.1 s	I.T./0.1904		1/2-	+ 0.586		0.1904
^{81}Kr		80.916593	$2.1x10^5$ y	EC/0.2807		7/2+	- 0.908	+ 0.64	Br k x-ray 0.2760
^{82}Kr	11.58(14)	81.913485				0+			
^{83m}Kr			1.86 h	I.T./0.0416		1/2-	+ 0.591		Kr k x-ray 0.00940 0.03216
^{83}Kr	11.49(6)	82.914137				9/2+	-0.970699	+0.253	
^{84}Kr	57.00(4)	83.911508				0+			
^{85m}Kr			4.48 h	β- /79 / I.T./21 /0.305	0.83/79	1/2-	+ 0.633		0.30487 0.15118
^{85}Kr		84.912530	10.73 y	β- /0.687	0.15/0.4	9/2+	1.005	+0.43	0.51399
^{86}Kr	17.30(22)	85.910615				0+			
^{87}Kr		86.913359	1.27 h	β- /3.887	1.33/8 3.49/43 3.89/30	5/2+	-1.023	- 0.30	0.40258/49.6 2.5548/9.2 (0.13-3.31)
^{88}Kr		87.91445	2.84 h	β- /2.91		0+			0.19632/26. 2.392/34.6 (0.03-2.8)
^{89}Kr		88.91764	3.15 m	β- /4.99	3.8/ 4.6/ 4.9/	5/2+	- 0.330	+ 0.16	0.19746 0.2209/19.9 0.5858/16.4 1.4728/6.8 (0.2-4.7)
^{90}Kr		89.91953	32.3 s	β- /4.39	2.6/77 2.8/6	0+			0.12182/32.9 0.5395/28.6 1.1187/36.2 (0.1-4.2)
^{91}Kr		90.9234	8.6 s	β- /6.4	4.33/ 4.59/	5/2+	- 0.583	+ 0.30	0.10878/43.5 0.50658/19. (0.2-4.4)
^{92}Kr		91.92611	1.84 s	β- /5.99 n/					0.1424/66. (0.14-3.7)
^{93}Kr		92.9312	1.29 s	β- /8.6 n/	7.1/	1/2+	- 0.413		0.1820 0.2534/42. 0.32309/24.6 (0.057-4.03)
^{94}Kr		93.9343	0.21 s	β- /7.3					0.2196/67

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.6293/100.
							- 0.410		(0.098-0.985)
^{95}Kr		94.9397	0.78 s	β- /9.7					
^{96}Kr		95.9431							
^{97}Kr		96.9486	< 0.1 s	β-					
^{98}Kr									
^{99}Kr									
^{100}Kr									
$_{37}$Rb		**85.4678(3)**							
^{74}Rb		73.9445	65. ms	β^+ /10.4					
^{75}Rb		74.93857	19. s	β^+ /7.02	2.31/				ann. rad.
									0.179
^{76}Rb		75.93508	39. s	β^+ /8.50	4.7/	1-	-0.372623	+0.4	ann.rad.
									0.4240/92.
									(0.064-1.68)
^{77}Rb		76.93041	3.8 m	β^+ /5.34	3.86/	3/2-	+0.654468	+0.70	ann.rad.
									0.0665/59
									(0.04-2.82)
^{78m}Rb			5.7 m	I.T./0.1034		4-			ann.rad.
				β^+ /	3.4				0.4553/81.
				EC/					(0.103-4.01)
^{78}Rb		77.92814	17.7 m	β^+ /7.22		0+			ann.rad.
				EC/					0.4553/63.
									(0.42-5.57)
^{79}Rb		78.92400	23. m	β^+ /84 /3.65		5/2+	+0.3358	-0.10	ann.rad.
				EC/16 /					0.68812/23.
									(0.017-3.02)
^{80}Rb		79.92252	34. s	β^+ /5.72	4.1/22	1+	-0.0836	+0.35	ann.rad.
					4.7/74				0.6167/25.
^{81m}Rb			30.5 m	I.T./0.85	1.4	9/2+			ann.rad.
				β^+,EC/					(0.085-1.9)
^{81}Rb		80.91900	4.57 h	β^+/27 /2.24	1.05/	3/2-	+2.060	+0.40	ann.rad./
				EC/73					0.19030/64.
									(0.05-1.9)
^{82m}Rb			6.47 h	β^+/26 /	0.80/	5-	+1.5		ann.rad./
				EC/74 /					0.5544/63.
									0.7765/85.
									(0.092-2.3)
^{82}Rb		81.91821	1.258 m	β^+/96 /4.40	3.3/	1+	+0.554508	+0.19	ann.rad./
				EC/4 /					0.7665/13.
									(0.47-3.96)
^{83}Rb		82.91511	86.2 d	EC/0.91		5/2-	+1.425	+0.20	Kr x-ray
									0.5205/46.
									(0.03-0.80)
^{84m}Rb			20.3 m	I.T./0.216		6-			0.2163/34.
									0.2482/63.
									0.4645/32.
^{84}Rb		83.914387	32.9 d	β^+/22 /2.681	0.780/11	2-	-1.32412	-0.015	ann.rad./
				EC/75 /	1.658/11				0.8817/68.
				β-/3 /0.894	0.893/				(1.02-1.9)
^{85}Rb	72.17(2)	84.911792				5/2-	+1.353	+0.23	
^{86m}Rb			1.018 m	I.T./0.5560		6-			0.556/98.
^{86}Rb		85.911170	18.65 d	β-/1.775	1.774/8.8	2-	-1.6920		1.0768/8.8

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{87}Rb	27.83(2)	86.909186	4.88×10^{10} y	β-/0.283	0.273/100	3/2-	+2.7512		
^{88}Rb		87.911323	17.7 m	β-/5.316	5.31	2-	0.508		0.8980/14. 1.8360/21. (0.34-4.85)
^{89}Rb		88.91229	15.4 m	β-/4.50	1.26/38 1.9/5 2.2/34 4.49/18	3/2-	+2.304	+0.14	1.032/58. 1.248/42. 2.1960/13 (0.12-4.09)
^{90m}Rb			4.3 m	β-/4.50	1.7/ 6.5/	4-			0.1069(IT) 0.8317/94 (0.20-5.00)
^{90}Rb		89.91481	2.6 m	β-/6.59	6.6	1-			0.8317/28. (0.31-5.60)
^{91}Rb		90.91649	58.0 s	β-/5.861	5.9	3/2-	+2.182	+0.15	0.0936/34. (0.35-4.70)
^{92}Rb		91.91968	4.48 s	β-/8.11	8.1/94	1-			0.8148/8. (0.1-6.1)
^{93}Rb		92.92195	5.85 s	β-/7.46 n/1	7.4/	5/2	+1.410	+0.18	0.2134/4.8 0.4326/12.5 0.9861/4.9 (0.16-5.41)
^{94}Rb		93.92643	2.71 s	β-/10.31 n/10	9.5/	3	+1.498	+0.16	0.8369/87. 1.5775/32. (0.12-6.35)
^{95}Rb		94.92929	0.377 s	β-/9.30 n/8	8.6/	5/2	+1.334	+0.21	0.352/65. 0.680/22. (0.20-2.27)
^{96}Rb		95.93427	0.199 s	β-/11.76 n/13/	10.8/	2+	+1.466	+0.25	0.815/76. (0.20-5.42)
^{97}Rb		96.93733	0.169 s	β-/10.42 n/27/	10.0	3/2	+1.841	+0.58	0.167/100. 0.585/79. 0.599/56. 1.258/52. (0.14-2.08)
^{98}Rb		97.94174	0.107 s	β-/12.34 n/13	0.144/				(0.07-3.68)
^{99}Rb		98.9453	59. ms	β-/11.3					
^{100}Rb		99.9499	53. ms	β- /13.5					
^{101}Rb		100.9532	0.03 s	β- /11.8					
^{102}Rb		101.9592	0.09 s	β-					
$_{36}$Sr		**87.62(1)**							
^{73}Sr		72.966							
^{74}Sr		73.9563							
^{75}Sr		74.9499	$\approx$ 0.07 s						
^{76}Sr		75.9416	8.9 s	β^+ /6.1					
^{77}Sr		76.9378	9.0 s	β^+ /6.9	5.6		-0.35	1.4	0.147
^{78}Sr		77.93218	2.7 m	β^+ /3.76					(0.047-0.793)
^{79}Sr		78.92971	2.1 m	β^+ /5.32	4.1	3/2-	-0.474	+0.74	ann.rad./ 0.039/28. 0.105/22. (0.135-0.612)
^{80}Sr		79.92453	1.77 h	β^+ /1.87		0+			ann.rad./ 0.174/10.

TABLE OF THE ISOTOPES

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^{81}Sr		80.92322	22.3 m	β^+ /87 /3.93 EC/13 /	2.43/ 2.68/	1/2-	+0.544		0.589/39. (0.24-0.55) ann.rad./ 0.148/31. 0.1534/35 (0.06-1.7)
^{82}Sr		81.91840	25.36 d	EC/0.18					Rb x-ray
^{83m}Sr			5.0 s	I.T./0.2591		1/2-			0.2591/87.5
^{83}Sr		82.91756	1.350 d	β^+/24 /2.28 EC/76/	0.465/ 0.803/ 1.227/	7/2+	-0.898	+0.8	ann.rad./ 0.3816/12. 0.3816 0.7627/30. (0.094-2.15)
^{84}Sr	0.56(1)	83.913426				0+			
^{85m}Sr			1.127 h	I.T./87 /0.2387 EC/13		1/2-			0.2318/84. (0.15-0.24)
^{85}Sr		84.912936	64.85 d	EC/1.065		9/2+	-1.001	+0.32	0.51399/99.3
^{86}Sr	9.86(1)	85.909265				0+			
^{87m}Sr			2.81 h	I.T./0.3884		1/2-			0.3884(IT)
^{87}Sr	7.00(1)	86.908882				9/2+	-1.09360	+0.34	
^{88}Sr	82.58(1)	87.905617				0+			
^{89}Sr		88.907455	50.52 d	β-/1.497	1.492/100	5/2+	-1.149	-0.3	0.9092
^{90}Sr		89.907738	29.1 y	β-/0.546	0.546/100	0+			
^{91}Sr		90.91020	9.5 h	β-/2.70	0.61/7 1.09/33 1.36/29 2.66/26	5/2+	-0.887	+0.044	0.5556/61. 0.7498/24. 1.0243/33. (0.12-2.4)
^{92}Sr		91.91098	2.71 h	β-/1.91	0.55/96 1.5/3	0+			1.3831/90. (0.24-1.1)
^{93}Sr		92.91394	7.4 m	β-/4.08	2.2/10 2.6/25 3.2/65	5/2+	-0.794	+0.27	0.5903/ 0.7104 0.87573 0.8883/ (0.17-3.97)
^{94}Sr		93.91537	1.25 m	β-/3.511	2.1/ 3.3/	0+			0.6219 0.7043 0.7241 0.8064 1.4283
^{95}Sr		94.91931	25.1 s	β-/6.08	6.1/50	1/2+	-0.5379		0.6859 0.8269 2.7173 2.9332
^{96}Sr		95.92165	1.06 s	β-/5.37	4.2/	0+			0.1222 0.5305 0.8094 0.9318
^{97}Sr		96.92615	0.42 s	β-/7.47	5.3	(1/2+)	-0.500		0.2164 0.3071 0.6522 0.9538 1.2580 1.9050
^{98}Sr		97.92845	0.65 s	β-/5.83	5.1				0.0365 0.1190

TABLE OF THE ISOTOPES

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									0.4286 0.4447 0.5636
^{99}Sr		98.9333	0.27 s	β-/8.0					
^{100}Sr		99.9354	0.201 s	β-/7.1					
^{101}Sr		100.9405	0.115 s	β-/9.5					
^{102}Sr		101.9430	68. ms	β-/8.8					
^{103}Sr		102.9490							
^{104}Sr		103.952							
^{105}Sr									
$_{39}$Y		**88.90585(2)**							
^{78}Y		77.9435		β^+/10.5					
^{79}Y		78.9374	15. s	β^+/7.1					(0.152-1.106)
^{80}Y		79.9320	36. s	β^+/7.0	5.5 5.0/	(4)			ann.rad./ 0.3858 0.5951 1.1852
^{81}Y		80.9291	1.21 m	β^+/5.5	3.7/ 4.2/				ann.rad./ 0.428 0.469
^{82}Y		81.9268	9.5 s	β^+/7.8	6.3/	1+			ann.rad./ 0.5736 0.6017 0.7375
^{83m}Y			2.85 m	β^+/95/4.6 EC/5 /	2.9	1/2-			ann.rad./ 0.2591 0.4218 0.4945
^{83}Y		82.92235	7.1 m	β^+/4.47 EC/	3.3	9/2+			ann.rad./ 0.0355 0.4899 0.8821 (0.03-3.4)
^{84m}Y			4.6 s	β^+/ EC/		1+			ann.rad./ 0.7930
^{84}Y		83.9203	40. m	β^+/6.4 EC/	1.64/47 2.24/25 2.64/21 3.15/7	5-			ann.rad./ 0.4628 0.6606 0.7931 0.9744 1.0398 (0.2-3.3)
^{85m}Y			4.9 h	β^+/70 / EC/30 /		9/2+			ann.rad./ 0.2317 0.5356 0.7673 2.1238 (0.1-3.1)
^{85}Y		84.91643	2.6 h	β^+/55 /3.26 EC/45 /	1.54/	1/2-			ann.rad./ 0.2317 0.5045 0.9140 (0.07-1.4)

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^{86m}Y			48. m	I.T./99 / β^+/ EC/		8+			ann.rad./ 0.0102(IT) 0.2080 (0.09-1.1)
^{86}Y		85.91489	14.74 h	β^+/5.24 EC/		4-	<0.6		ann.rad./ 0.3070 0.6277 1.0766 1.1531 1.9207 (0.1-3.8)
^{87m}Y			13. h	I.T./98 / β^+/0.7 / EC/	1.15/0.7	9/2+			0.3807
^{87}Y		86.910880	3.35 d	EC/99+/1.862	0.78/	1/2-			0.3880 0.4870
^{88}Y		87.909506	106.6 d	EC/99+ /3.623 β^+/0.2 /	0.76/	4-			ann.rad./ 0.89802 1.83601 2.73404 3.2190
^{89m}Y			15.7 s	I.T./0.909		9/2+			0.9092(IT)
^{89}Y	100.	88.905849				1/2-		-0.13742	
^{90m}Y			3.24 h	I.T./99+ /0.68204 β-/0.002/			7+		0.2025 0.4794 0.6820
^{90}Y		89.907152	2.67 d	β-/2.282	2.28/	2-	-1.630	-0.155	
^{91m}Y			49.7 m	I.T./0.555		9/2+	6.0		0.5556(IT)
^{91}Y		90.907301	58.5 d	β-/1.544	1.545/	1/2-	0.1641		1.208
^{92}Y		91.90893	3.54 h	β-/3.63	3.64/	2-			0.4485 0.5611 0.9345 1.4054 (0.4-3.3)
^{93m}Y			0.82 s	I.T./0.759		9/2+			0.1686(IT) 0.5902
^{93}Y		92.90956	10.2 h	β-/2.87	2.88/90	1/2-			0.2669 0.9471 1.9178
^{94}Y		93.91160	18.7 m	β-/4.919	4.92/	2-			0.3816 0.9188 1.1389 (0.3-4.1)
^{95}Y		94.91279	10.3 m	β-/4.42		1/2-			0.4324 0.9542 2.1760 3.5770
^{96m}Y			9.6 s	β-/		(3+)			0.1467 0.6174 0.9150 1.1071 1.7507
^{96}Y		95.91588	6.2 s	β- /7.09	7.12/	0-			1.594
^{97m}Y			1.21 s	β- /7.4	4.8/ 6.0/	9/2+			0.1614 0.9700

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									1.1030
^{97}Y		96.91813	3.76 s	β- /6.69	6.7	1/2-			0.2969
									1.9960
									3.2876
									3.4013
^{98m}Y			2.1 s	β- /9.8	5.5/	(4-)			0.2415
									0.6205
									0.6473
									1.2228
									1.8016
^{98}Y		97.92224	0.59 s	β- /8.83	8.7/	1+			0.2131
									1.2228
									1.5907
									2.9413
									4.4501
^{99}Y		98.92463	1.47 s	β- /7.57		1/2-			0.1218/43.8
				n	/2.5/				0.5362
									0.7242
									1.0130
^{100m}Y			0.94 s	β-,n /		3+			
^{100}Y		99.9278	0.73 s	β-,n /9.3	n/1.8/	1+			
^{101}Y		100.9303	0.43 s	β-,n /8.6	n/1.5/	(5/2)			
^{102}Y		101.9336	0.36 s	β-,n /9.9	n/4.0/				
^{103}Y		102.9369	0.23 s	β$^-$,n	n/8.3/				
^{104}Y		103.9414							
^{105}Y		104.9451							
^{106}Y		105.950							
^{107}Y									
^{108}Y									
$_{40}$Zr		**91.224(2)**							
^{80}Zr		79.9406		β$^+$ /8.0					0.290
									0.538
^{81}Zr		80.9368	15. s	β$^+$ /7.2	6.1				
^{82}Zr		81.9311	32. s	β$^+$ /4.0	3.				ann.rad./
^{83m}Zr			7. s	β$^+$ /7.0		(7/2+)			ann.rad./
^{83}Zr		82.9287	44. s	β$^+$ /5.9	4.8	(1/2-)			ann.rad./
				EC					0.0556
									0.1050
									0.2560
									0.474
									1.525
^{84}Zr		83.9233	26. m	β$^+$ /2.7		0+			ann.rad./
				EC/					0.0449
									0.1125
									0.3729
									0.667
^{85m}Zr			10.9 s	I.T./0.2922		1/2-			ann.rad./
				β$^+$,EC/					0.2922(IT)
									0.4165
^{85}Zr		84.9215	7.9 m	β$^+$ /4.7	3.1	7/2+			ann.rad./
				EC/					0.2663
									0.4163
									0.4543

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{86}Zr		85.91647	16.5 h	EC/1.47		0+			0.0280 0.243 0.612
^{87m}Zr			14.0 s	I.T./0.3362		1/2-			0.1352(IT) 0.2010
^{87}Zr		86.91482	1.73 h	β^+ /3.67 EC/	2.26	9/2+			ann.rad./ 0.3811 1.228
^{88}Zr		87.91023	83.4 d	EC/0.67		0+			0.3929
^{89m}Zr			4.18 m	I.T./94 /0.5877 β^+ /1.5 / EC/4.7 /		1/2-			ann.rad./ 0.5877(IT) 1.507
^{89}Zr		88.908889	3.27 d	β^+ /23 /2.832 EC/77 /	0.9/	9/2+	-1.07		ann.rad./ 0.9092
^{90m}Zr			0.809 s	I.T./		5-			0.1326 2.1862 2.3189(IT)
^{90}Zr	51.45(40)	89.904702				0+			
^{91}Zr	11.22(5)	90.905643				5/2+	-1.30362	-0.21	
^{92}Zr	17.15(8)	91.905039				0+			
^{93}Zr		92.906474	$1.5x10^6$y	β- /0.091		5/2+			0.0304
^{94}Zr	17.38(28)	93.906314				0+			
^{95}Zr		94.908041	64.02 d	β- /1.125	0.366/55 0.400/44	5/2+	1.10	+0.29	0.7242 0.7567
^{96}Zr	2.80(9)	95.908275				0+			
^{97}Zr		96.910950	16.8 h	β- /2.658	1.91/	1/2-			0.7434
^{98}Zr		97.91276	30.7 s	β- /2.26	2.2/100	0+			
^{99}Zr		98.91651	2.2 s	β- /4.56	3.9/ 3.5/	1/2+			0.4692/55.2 0.5459 0.5940
^{100}Zr		99.91776	7.1 s	β- /3.34		0+			0.4006 0.5043
^{101}Zr		100.92114	2.1 s	β- /5.49	6.2/	3/2-			0.1194 0.2057 0.2089
^{102}Zr		101.92298	2.9 s	β- /4.61					
^{103}Zr		102.9266	1.3 s	β- /7.0					
^{104}Zr		103.9288	1.2 s	β- /5.9					
^{105}Zr		104.9331	≈1. s	β- /8.5					
^{106}Zr		105.9359							
^{107}Zr		106.941							
^{108}Zr		107.944							
^{109}Zr									
^{110}Zr									
^{41}Nb		**92.90638(2)**							
^{82}Nb		81.9431		β^+ /11.					
^{83}Nb		82.9367		β^+ /7.5					
^{84}Nb		83.9336	12. s	β^+ ,EC/9.6		(3+)			
^{85}Nb		84.9279	2.3 m	β^+ /6.0					
^{86m}Nb			56. s	β^+					
^{86}Nb		85.9250	1.46 m	β^+ /8.0					ann.rad./ 0.751 1.003

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{87m}Nb			3.7 m	β^+ / EC/		1/2-			ann.rad./ 0.1352 0.2010
^{87}Nb		86.92036	2.6 m	β^+ 5.2/ EC/		(9/2+)			ann.rad./ 0.2010 0.4706 0.6165 1.0665 1.8842
^{88m}Nb			7.7 m	β^+ / EC/		4-			ann.rad./ 0.2625 0.3996 1.0569 1.0825
^{88}Nb		87.9183	14.3 m	β^+ /7.6 EC/	3.2/	8+			ann.rad./ 1.0570 1.0828 (0.07-2.5)
^{89m}Nb			2.0 h	β^+ / EC/	3.3/	9/2+			0.5880/10(D) (0.17-4.0)
^{89}Nb		88.91349	1.10 h	β^+ /74 /4.29 EC/26 /	2.8/	1/2-	+6.216		ann.rad./ 0.5074 0.5880 0.7696 1.2775
^{90m}Nb			18.8 s	I.T./0.1246		4-			0.002 0.1225
^{90}Nb		89.911263	14.6 h	β^+ /53 /6.111 EC/47 /	0.86/5 1.5/92	8+	4.961	+0.005	ann.rad./ 0.1412 1.1292 2.1862 2.3189 (0.1-3.3)
^{91m}Nb			62. d	I.T./97 / EC/3 /		1/2-			0.1045(IT) 1.2050
^{91}Nb		90.906989	7x10^{2}y	EC/1.253		9/2+			Mo k x-ray
^{92m}Nb			10.13 d	EC/99+ /		2+	6.114		0.9126 0.9345 1.8475
^{92}Nb		91.907192	3.7x10^{7}y	EC/2.006		7+			0.5611 0.9345
^{93m}Nb			16.1 y	I.T./0.0304		1/2-			Nb x-ray 0.0304
^{93}Nb	100.	92.906376				9/2+	+6.1705	-0.32	
^{94m}Nb			6.26 m	I.T./99+ /2.086 β- /0.5 /		3+			Nb k x-ray 0.0409 0.87109
^{94}Nb		93.907282	2.4x10^{4}y	β- /2.045	0.47/	6+			0.70263 0.87109
^{95m}Nb			3.61 d	I.T./97.5 /0.2357 β- /2.5 /			1/2-		0.2040 0.2356
^{95}Nb		94.906834	34.97 d	β- /0.926	0.160/	9/2+	6.141		0.76578
^{96}Nb		95.908099	23.4 h	β- /3.187	0.5/10 0.75/90	6+	4.976		0.7782 0.2191-1.498
^{97m}Nb			58.1 s	I.T./0.7434	0.734/98	1/2-			0.7434

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{97}Nb		96.908096	1.23 h	β- /1.934	1.27/98	9/2+	6.15		0.4809 0.6579
^{98m}Nb			51. m	β- /4.67		5+			0.7874 0.1726-1.89
^{98}Nb		97.91033	2.9 s	β- /4.59	4.6/	1+			0.6451 0.7874 1.0243
^{99m}Nb			2.6 m	β- /	3.2/	1/2-			0.0978/100 (0.138-3.010)
^{99}Nb		98.91162	15.0 s	β- /3.64	3.5/100	9/2+			0.0977 0.1378/3.1
^{100m}Nb			3.0 s	β- /6.74	5.8				Nb k x-ray 0.159 0.6364 1.0637
^{100}Nb		99.91418	1.5 s	β- /6.25	6.2/ 5.3/				0.5354 0.6001-1.566
^{101}Nb		100.91525	7.1 s	β- /4.57	4.3/				0.1105-0.810
^{102m}Nb			4.3 s	β- /					
^{102}Nb		101.91804	1.3 s	β- /7.21	7.2/				0.2960-2.184
^{103}Nb		102.91914	1.5 s	β- /5.53	5.3/	5/2+			
^{104m}Nb			0.9 s	β-,n/	n/0.06				
^{104}Nb		103.9225	4.8 s	β-,n/8.1	n/0.05				
^{105}Nb		104.9239	3.0 s	β-,n/6.5	n/1.7				
^{106}Nb		105.9282	1.0 s	β-,n/9.3	n/4.5				
^{107}Nb		106.9303	0.30 s	β-,n/7.9	n/6.0				
^{108}Nb		107.9350	0.19 s	β ,n/	n/6.2				(0.193-0.590)
^{109}Nb		108.9376	0.19 s	β ,n/	n/31				
^{110}Nb		109.943	0.17 s	β ,n/	n/40				
^{111}Nb									
^{112}Nb									
^{113}Nb									
$_{42}$Mo		**95.94(1)**							
^{84}Mo		83.9401		β^+ /6.					
^{85}Mo		84.9366	3.2 s	β^+/8.1					
^{86}Mo		85.9302	20. s	β^+ /4.8					
^{87}Mo		86.9273	14. s	EC, β^+/6.5					(0.752-1.004)
^{88}Mo		87.92195	8.0 m	β^+ /3.4 EC		0+			ann.rad./ 0.0800 0.1399 0.1707
^{89m}Mo			0.19 s	I.T./0.118		1/2-			0.118(IT) 0.268
^{89}Mo		88.91948	2.2 m	β^+ /5.58 EC/		9/2+			ann.rad./ 0.659 0.803 1.155 1.272
^{90}Mo		89.91394	5.7 h	β^+ /25 /2.489 EC/75 /	1.085/	0+			ann.rad./ 0.04274 0.12237 0.25734
^{91m}Mo			1.08 m	I.T./50 /0.653		1/2-			ann.rad./

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
				β^+ ,EC/50 /	2.5/ 2.8/ 4.0/				0.6529 1.2081 1.5080 2.2407
^{91}Mo		90.91175	15.5 m	β^+ /94 /4.43 EC/6 /	3.44/94	9/2-			ann.rad./ 1.6373 2.6321 3.0286 (0.1-4.2)
^{92}Mo	14.84(35)	91.906810				0+			
^{93m}Mo			6.9 h	I.T./99+ /2.425	21/2+	+9.21			0.26306(IT) 0.68461 1.47711
^{93}Mo		92.906811	$3.5x10^3$y	EC/0.405		5/2+			0.0304
^{94}Mo	9.25(12)	93.905087				0+			
^{95}Mo	15.92(13)	94.905841				5/2+	-0.9142	-0.02	
^{96}Mo	16.68(2)	95.904678				0+			
^{97}Mo	9.55(8)	96.906020				5/2+	-0.9335	+0.26	
^{98}Mo	24.13(31)	97.905407				0+			
^{99}Mo		98.907711	2.7476 d	β- /1.357	0.45/14 0.84/2 1.21/84	1/2+	0.375		0.144048 0.18109 0.36644 0.73947
^{100}Mo	9.63(23)	99.90748				0+			
^{101}Mo		100.91035	14.6 m	β- /2.82	2.23/ 0.7/	1/2+			0.0063 0.19193 0.5909 (0.0809-2.405)
^{102}Mo		101.91030	11.3 m	β- /1.01	1.2/	0+			0.1493/89. 0.2116/100. 0.2243/32.
^{103}Mo		102.91320	1.13 m	β- /3.8		3/2+			0.1028(2)/ 0.1440(2) 0.2511(2)
^{104}Mo		103.91376	1.00 m	β- /2.16		0+			0.0686(1)/100. 0.4239(4)/21.
^{105}Mo		104.9170	36. s	β- /4.95		3/2+			0.0642/ 0.0856/ 0.2495/
^{106}Mo		105.91814	8.4 s	β- /3.52		0+			0.1894(2)/22. 0.3644(2)/6. 0.3723(2)/12.
^{107}Mo		106.9217	3.5 s	β- /6.2					
^{108}Mo		107.9236	1.1 s	β- /5.1					(0.028-0.636)
^{109}Mo		108.9278	0.5 s	β- /7.2					
^{110}Mo		109.9297	0.30 s	β- /5.7					Tc k x-ray 0.142 (0.039-0.599)
^{111}Mo		110.9345							
^{112}Mo		111.937							
^{113}Mo		112.942							
^{114}Mo									
^{115}Mo									
^{116}Mo									
^{117}Mo									

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
$_{43}$Tc									
^{86}Tc		85.9430		β^+ /11.9					
^{87}Tc		86.9365		β^+ /8.6					
^{88}Tc		87.9328		β^+ /10.1					
^{89m}Tc			13. s						
^{89}Tc		88.9275	13. s	β^+ /7.5					
^{90m}Tc			49.2 s	β^+	5.3/	6+			ann.rad./ 0.9479/ 1.0542/
^{90}Tc		89.9235	8.3 s	β^+ /8.9	7.0/15 7.9/95.	1+			ann.rad./ 0.9479/
^{91m}Tc			3.3 m	β^+ EC		1/2+			ann.rad./170. 0.3375(2)/1.1 0.8110(5)/5. 1.6052(1)/7.8 1.6339(1)/9.1 1.9023(1)/6. 2.4509(1)/13.5
^{91}Tc		90.9184	3.14 m	β^+ /6.2	5.2	9/2+			ann.rad./200.
^{92}Tc		91.91526	4.4 m	β^+ /7.87 EC	4.1	8+			ann.rad./200. 0.0850/ 0.1475 0.3293 0.7731 1.5096
^{93m}Tc			43. m	I.T./13 EC/20		1/2-			0.3924(IT) 0.9437 2.6445
^{93}Tc		92.910248	2.73 h	β^+ /13/3.201 EC/87/	0.81	9/2+	6.26		ann.rad./ 1.3629 1.4771 1.5203 (0.1-3.0)
^{94m}Tc			52. m	β^+ /72/4.33 EC/28/		2+			ann.rad./ 0.8710 1.8686
^{94}Tc		93.909655	4.88 h	β^+ /11/4.256 EC/89/		7+	5.08		ann.rad./ 0.4491 0.7026 0.8496 0.8710
^{95m}Tc			61. d	I.T./4/ β^+ /0.3 EC/96	0.5/ 0.7/	1/2-			ann.rad./ 0.0389(IT) 0.2041 0.5821 0.5821 0.8351
^{95}Tc		94.90766	20.0 h	EC/100/1.691		9/2+	5.89		0.7657 1.0738
^{96m}Tc			52. m	I.T./90/ β^+ ,EC/2/		4+			0.0342(IT) 0.7782 1.2002
^{96}Tc		95.90787	4.3 d	EC/2.973		7+	+5.04		Mo k x-ray

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.7782
									0.8125
									0.8498
									1.12168
^{97m}Tc			90. d	I.T./0.0965		1/2-			Tc k x-ray
									0.0965
^{97}Tc		96.906364	2.6×10^{6} y	EC/100/0.320		9/2+			Mo k x-ray
^{98}Tc		97.907215	4.2×10^{6} y	β- /1.80	0.40/100	6+			0.65241
									0.74535
^{99m}Tc			6.01 h	I.T./100/0.142		1/2-			Tc k x-ray
									0.14049
									0.14261
^{99}Tc		98.906254	2.13×10^{5} y	β- /0.294	0.293/100	9/2+	+5.6847	-0.129	
^{100}Tc		99.907657	15.8 s	β- /3.202	2.2/	1+			0.5396
				EC /$1.8(10)^{-3}$/0.17	2.9/				0.5908
					3.3				1.5122
									(0.3-2.6)
^{101}Tc		100.90731	14.2 m	β- /1.61	1.32/	9/2+			0.1272
									0.1841
									0.3068
									0.5451
									(0.073-0.969)
^{102m}Tc			4.4 m	I.T./2/4.8	1.8/				0.4184
				β- /98/					0.4752
									0.6281
									0.6302
									1.0464
									1.1033
									1.6163
									2.2447
^{102}Tc		101.90921	5.3 s	β- /4.53	3.4/	1+			0.4686
					4.2				0.4751
					2.2/				1.1055
^{103}Tc		102.90918	54. s	β- /2.66	2.0/	5/2+			0.1361
					2.2/				0.1743
									0.2104
									0.3464
									0.5629
									(0.13-1.0)
^{104}Tc		103.91144	18.2 m	β- /5.60	5.3/	(3+)			0.3483
									0.3580
									0.5305
									0.5351
									0.8844
									0.8931
									1.6768
									(0.3-3.7)
^{105}Tc		104.91166	7.6 m	β- /3.6	3.4/	5/2+			0.1079
									0.1432
									0.3215
^{106}Tc		105.91436	36. s	β- /6.55		2+			0.2703
									0.5222
									1.9694
									2.2393
									2.7893

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{107}Tc		106.9151	21.2 s	β- /4.8					0.1027 0.1063 0.1770 0.4587
^{108}Tc		107.9185	5.1 s	β- /7.72		(3)			0.2422 0.4656 0.7078 0.7326 1.5835
^{109}Tc		108.9200	1.4 s	β- /6.3	p/0.08				
^{110}Tc		109.9234	0.83 s	β- /8.8	p/0.04				0.2407
^{111}Tc		110.9250	0.30 s	β-.n /7.0	n/0.85				
^{112}Tc		111.9292	0.21 s	β,n	n/2.6				
^{113}Tc		112.931	0.13 s	β- /8.					
^{114}Tc		113.936							
^{115}Tc		114.938							
^{116}Tc									
^{117}Tc									
^{118}Tc									
^{44}Ru		**101.07(2)**							
^{87}Ru		86.949							
^{88}Ru		87.9404							
^{89}Ru		88.936		β^+ /8.					
^{90}Ru		89.9298	11. s	β^+ /5.9					ann.rad./ 0.155-1.551
^{91}Ru		90.9264	9. s	β^+ ,EC/7.4		9/2+			ann.rad./
^{92}Ru		91.9201	3.7 m	β^+ /53/4.5 EC/47/		0+			ann.rad./ 0.1346 0.2138 0.2593
^{93m}Ru			10.8 s	I.T./21/ β^+ ,EC/79/	5.3/	1/2-			ann.rad./ 0.7344 1.1112 1.3962 2.0931
^{93}Ru		92.9171	1.0 m	β^+ /6.3 EC/		9/2+			ann.rad./ 0.6807 1.4349 (0.5- 4.2) weak
^{94}Ru		93.91137	52. m	EC/100/1.59					0.3672 0.5247 0.8922
^{95}Ru		94.91042	1.64 h	EC/85/2.57 β^+ /15/	1.20/ 0.91/	5/2+	0.86		ann.rad./ 0.2904 0.3364 0.6268
^{96}Ru	5.52(20)	95.90760				0+			
^{97}Ru		96.90756	2.89 d	EC/1.12		5/2+	-0.78		Tc k x-ray 0.2157 0.3245 0.4606
^{98}Ru	1.88(9)	97.90529				0+			
^{99}Ru	12.74(26)	98.905939				5/2+	-0.6413	+0.079	

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{100}Ru	12.60(19)	99.904219				0+			
^{101}Ru	17.05(7)	100.905582				5/2+	-0.7188	+0.46	
^{102}Ru	31.57(31)	101.904349				0+			
^{103}Ru		102.906323	39.27 d	β- /0.763	0.223	3/2+	0.20	+0.62	0.05329 0.29498 0.4438 0.49708 0.55704 0.61033 (0.04-1.6)
^{104}Ru	18.66(44)	103.905430				0+			
^{105}Ru		104.907750	4.44 h	β- /1.917	1.11/22 1.134/13 1.187/49	3/2+	-0.3		0.12968 / 0.0 0.1491 0.2629 0.31664 0.46943 0.67634 0.72420 (0.1-1.8)
^{106}Ru		105.90733	1.020 y	β- /0.0394	0.0394/100	0+			
^{107}Ru		106.9099	3.8 m	β- /2.9	2.1/ 3.2/				0.1939 0.3741 0.4625 0.8488
^{108}Ru		107.9102	4.5 m	β- /1.4	1.2/				0.0923 0.1651 0.4339 0.4975 0.6189
^{109}Ru		108.91320	34.5 s	β- /4.2					0.1164 0.3584
^{110}Ru		109.9140	15. s	β- /2.81					0.1121 0.3737 0.4397 0.7967
^{111}Ru		110.9176	1.5 s	β- /5.5					
^{112}Ru		111.9188	4.5 s	β- /4.5					
^{113}Ru		112.9225	2.7 s	β- /7.					
^{114}Ru		113.9239	0.57 s	β- /6.1					0.127/24 (0.053-0.180)
^{115}Ru		114.928	≈0.74 s	β- /8.					
^{116}Ru		115.930							
^{117}Ru		116.935							
^{118}Ru		117.937							
^{119}Ru									
^{120}Ru									
$_{45}$Rh		**102.90550(2)**							
^{89}Rh		88.9494							
^{90}Rh		89.9429							
^{91}Rh		90.9366							
^{92}Rh		91.9320		β^+ /11.1					
^{93}Rh		92.9257		β^+ /8.1					(0.138-1.493)
^{94m}Rh			25.8 s	β^+ /		8+			ann.rad./

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{94}Rh		93.9217	1.18 m	β^+ /9.6	6.4/	3+			0.1264 0.3117 0.7562 1.0752 1.4307 ann.rad./
^{95m}Rh			1.96 m	I.T./88/ β^+ ,EC/12/		1/2+			0.1461 0.3117 0.7562 1.4307 ann.rad./ 0.5433(IT)
^{95}Rh		94.9159	5.0 m	β^+ /5.1	3.2	9/2+			0.7837 ann.rad./
^{96m}Rh			1.51 m	I.T./60 /0.052 β^+ ,EC/40/	4.70/	2+			0.2293 0.4103 0.6610 0.9416 1.3520 (0.2-3.8) ann.rad./ Tc,Ru x-rays
^{96}Rh		95.91452	9.6 m	β^+/6.45 EC/	3.3/	5+			0.8326 1.0985 1.6921 (0.4-3.3) ann.rad./
^{97m}Rh			46.m	I.T./5 / β^+,EC/95 /	2.6/	1/2-			0.4299 0.6315 0.6853 0.7418 0.8326 (0.2-3.4) ann.rad./
^{97}Rh		96.91134	31.0m	β^+ /3.52	2.1/	9/2+			0.1886 0.4215 2.2452 ann.rad./
^{98m}Rh			3.5 m	β^+ /		5+			0.1886 0.3892 0.4515 0.8398 0.8788 (0.2-3.5) ann.rad./
^{98}Rh		97.91072	8.7 m	β^+ /90 /5.06	3.4/	2+			0.6154 0.6524 0.7452 ann.rad./
^{99m}Rh			4.7 h	β^+ /8 / EC/92 /	.74/	9/2+			0.6524 0.7623 ann.rad./ 0.2766/ 0.3408 0.6178 1.2612

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{99}Rh		98.90820	16. d	β^+/4 /2.10 EC/97 /	0.54/ 0.68/	1/2-			ann.rad./ 0.0894/ 0.3530 0.5277 (0.1-2.0)
^{100m}Rh			4.7 m	I.T./99 / β^+ /0.4 /		5+			ann.rad./ 0.0748/ 0.2647(IT)
^{100}Rh		99.90812	20.8 h	β^+ /3.63 EC/	2.62/ 2.07/	1-			0.4462 0.5396 0.5882 0.8225 1.5534 2.3761
^{101m}Rh			4.35 d	EC/92 / I.T./8 /0.1573		9/2+	+5.51		Rh k x-ray 0.1272/ 0.3069 0.5451
^{101}Rh		100.90616	3.3 y	EC/0.54		1/2-			Ru k x-ray 0.1272 0.1980 0.3252
^{102m}Rh			207. d	I.T./5 / β- /19/ β^+ /14/ EC/62/					ann.rad./ 0.4686 0.4751 0.5566 0.6280 1.1032 (0.4-1.6)
^{102}Rh		101.906842	2.9 y	EC/2.323		6+	4.04		Ru k x-ray 0.4751 0.6313 0.6975 0.7668 1.0466 1.1032
^{103m}Rh			56.12 m	IT		7/2+			
^{103}Rh	100.	102.905504				1/2-	-0.0884		
^{104m}Rh			4.36 m	I.T./99+ / β-	 1.3/	5+			Rh k x-ray 0.0514 0.0971 0.5558
^{104}Rh		103.906655	42.3 s	β- /99+ /2.441 EC/0.4/1.141	1.88/2 2.44/98	1+			0.3581 0.5558 1.2370 (0.35-1.8)
^{105m}Rh			40. s	I.T./1.296		1/2-			Rh k x-ray 0.1296
^{105}Rh		104.905692	35.4 h	β- /0.567	0.247/30 0.567/70	7/2+	+4.45		0.2801 0.3061 0.3189
^{106m}Rh			2.18 h	β- /	0.92/	6+			0.2217 0.4510 0.5119 0.6162 0.7173

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.7484
									1.0458
									1.5277
^{106}Rh		105.90729	29.9 s	β- /3.54	2.4/2	1+	2.58		0.51186/
					3.0/12				0.61612
					3.54/79				0.62187
									(0.05-3.04)
^{107}Rh		106.90675	21.7 m	β- /1.51	1.20/65	7/2+			0.2776
					1.5/17				0.3028
									0.3925
^{108m}Rh			6.0 m	β- /	1.57/				0.4339
									0.4973
									0.6189
^{108}Rh		107.9087	17. s	β- /4.5		1+			0.4046
									0.4339
									0.4973
									0.5811
									0.6146
									0.9014
									0.9471
^{109}Rh		108.90874	1.34 m	β- /2.59	2.25/	7/2+			0.1134
									0.1780
									0.2914
									0.3254
									0.3268
									0.4261
									(0.1-1.6)
^{110m}Rh			29. s	β- /	[.6/				0.3737
									0.4397
									0.7967
^{110}Rh		109.9110	3.1 s	β- /5.4	5.5/	1+			0.3737
									0.4400
									0.5463
									0.6877
									0.8381
									0.9045
^{111}Rh		110.9117	11. s	β- /3.7					0.275
^{112m}Rh			6.8 s	β- /					
^{112}Rh		111.9140	4. s	β- /6.2		1+			0.3489
^{113}Rh		112.9154	0.9 s	β- /4.9					0.1285
^{114m}Rh			1.8 s	β- /					
^{114}Rh		113.9173	1.8 s	β- /6.5		1+			
^{115}Rh		114.9201	0.99 s	β- /6.0					
^{116m}Rh			0.9 s	β- /					0.3405
^{116}Rh		115.9228	0.7 s	β- /8.0		1+			
^{117}Rh		116.925	0.44 s	β- /7.					0.0346
									0.1317
^{118}Rh		117.929							
^{119}Rh		118.931							
^{120}Rh		119.936							
^{121}Rh		120.938							
^{122}Rh									
$_{46}$Pd		**106.42(1)**							

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{91}Pd		90.949							
^{92}Pd		91.9404							
^{93}Pd		92.9359							
^{94}Pd		93.9288	9. s	EC,β^+ /≈ 6.6					0.5582 (0.0546-0.798)
^{95m}Pd		94.92684	13.4 s	EC,β^+ /10.2		21/2+			
^{95}Pd									
^{96}Pd		95.9182	2.03 m	EC,β^+ /3.5	1.15/				0.1248 0.4995
^{97}Pd		96.9165	3.1 m	β^+ ,EC/4.8	3.5/	5/2+			ann.rad./ 0.2653 0.4752 0.7927 (0.2-3.4)
^{98}Pd		97.91273	17.7 m	β^+ /1.87 EC/		0+			ann.rad./ 0.0677 0.1125 0.6630 0.8379
^{99}Pd		98.91181	21.4 m	β^+ /49 /3.37 EC/51 /	2.18/	5/2+			ann.rad./ 0.1360 0.2636 0.6734 (0.2-2.85)
^{100}Pd		99.90851	3.7 d	EC/0.36		0+			0.03271 0.0748 0.0840
^{101}Pd		100.90829	8.4 h	β^+ /5 /1.980 EC/95 /	0.776/	5/2+	-0.66		ann.rad./ 0.0244 0.2963 0.5904
^{102}Pd	1.02(1)	101.905607				0+			
^{103}Pd		102.906087	16.99 d	EC/0.543		5/2+			Rh k x-ray 0.03975 0.3575 0.4971
^{104}Pd	11.14(8)	103.904034				0+			
^{105}Pd	22.33(8)	104.905083				5/2+	-0.642	+0.66	
^{106}Pd	27.33(3)	105.903484				0+			
^{107m}Pd			20.9 s	I.T./0.2149		11/2-			Pd k x-ray 0.2149(IT)
^{107}Pd		106.90513	6.5x10^{6}y	β- /0.033	0.03/	5/2+			
^{108}Pd	26.46(9)	107.903895				0+			
^{109m}Pd			4.75 m	I.T./0.1889		11/2-			Pd x-ray 0.1889(IT)
^{109}Pd		108.905954	13.5 h	β- /1.116	1.028	5/2+			0.0880 (0.08-1.0)
^{110}Pd	11.72(9)	109.905153				0+			
^{111m}Pd			5.5 h	I.T./73 /0.172 β- /27 /	0.35 0.77	11/2-			0.0704 0.1722 0.3912 (0.1-1.97)
^{111}Pd		110.90764	23.4 m	β- /2.19	2.2/95	5/2+			0.0598 0.2454 0.5800

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.6504
									1.3885
									1.4590
^{112}Pd		111.90731	21.04 h	β- /0.29	0.28/	0+			0.018
^{113m}Pd			1.48 m	β- /		5/2+			0.0959
^{113}Pd		112.91015	1.64 m	β- /3.34					0.0958
									0.4824
									0.6436
									0.7394
^{114}Pd		113.91037	2.48 m	β- /1.45		0+			0.1266
									0.2320
									0.5582
									0.5760
^{115}Pd		114.9137	47. s	β- /4.58					0.1255
									0.2554
									0.3428
^{116}Pd		115.9142	12.7 s	β- /2.61					0.1015
									0.1147
									0.1778
^{117}Pd		116.9178	4.4 s	β- /5.7					0.2473
									(0.0766-0.4025)
^{118}Pd		117.9189	2.4 s	β- /4.1					0.1254
									(0.0284-0.5957)
^{119}Pd		118.9227	0.9 s	β- /6.5					0.2566
									(0.0699-0.3261)
^{120}Pd		119.9240	0.5 s	β- /5.0					0.1581
									(0.0525-0.5952)
^{121}Pd		120.9282							
^{122}Pd		121.9298							
^{123}Pd									
$_{47}$Ag		**107.8682(2)**							
^{94}Ag		93.9428	0.42 s	β^+, p/					
^{95}Ag		94.9355	2.0 s	β^+, p/					(0.539-2.025)
^{96}Ag		95.9307	5.1 s	β^+ /11.6					ann.rad./
				EC/					0.1248
									0.4995
									(0.1066-1.416)
^{97}Ag		96.9240	19. s	β^+ /7.0					ann.rad./
				EC/					0.6862
									1.2941
									(0.352-3.294)
^{98}Ag		97.9218	47. s	β^+ /8.4		5+			ann.rad./
				EC/					0.5711
									0.6786
									0.8631
									(0.153-1.185)
^{99m}Ag			11. s	I.T./100/		1/2-			Ag k x-ray
									0.1636(IT)
									0.3426
^{99}Ag		98.9176	2.07 m	β^+ /87 /5.4		9/2+			ann.rad./
				EC/13 /					0.2199
									0.2645
									0.8056

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{100m}Ag			2.3 m	β^+ / EC/		2+			0.8323 (0.2-3.5) ann.rad./ 0.6657
^{100}Ag		99.9161	2.0m	β^+/7.1 EC/	4.7/	5+			1.6941 ann.rad./ 0.2807 0.4503 0.6657 0.7508 0.7732
^{101m}Ag			3.1 s	I.T./0.23		1/2-			Ag k x-ray 0.0981 0.176(IT)
^{101}Ag		100.9128	11.1 m	β^+/69 /4.2 EC/31 /	2.7/ 2.18/ 2.73/ 3.38/	9/2+	5.7		ann.rad./ 0.2610 0.2747 0.3269 0.4392 0.6673 1.1739 (0.2-3.1)
^{102m}Ag			7.8 m	β^+ /38 / EC/13 / I.T./49 /	3.4	2+	+4.14		ann.rad./ 0.5567 0.9777 1.8347 2.0545 2.1594 3.2386
^{102}Ag		101.91197	13.0 m	β^+ /78 /5.92 EC/22 /	2.26/	5+	4.6		ann.rad./ 0.5567 0.7194 0.8354 1.2571 1.5816 1.7446
^{103m}Ag			5.7 s	I.T./0.134		1/2-			Ag k x-ray 0.1344
^{103}Ag		102.90897	1.10 h	β^+ /28 /2.69 EC/72 /	1.7 1.3	7/2+	+4.47		ann.rad./ 0.1187 0.1482
^{104m}Ag			33. m	β^+ /64/ EC/36/ I.T./0.07/	2.71/	2+	+3.7		ann.rad./ 0.5558 0.7657 (0.5-3.4)
^{104}Ag		103.90863	69. m	β^+ /16 /4.28 EC/84 /	0.99/	5+	3.92		ann.rad./ 0.5558 0.9259 0.9416 (0.18-2.27)
^{105m}Ag			7.2 m	I.T./98 /0.0255 EC/2 /		7/2+			Ag x-ray 0.3063 0.3192 (0.1-1.0)
^{105}Ag		104.90653	41.3 d	EC/1.35		1/2-	0.1014		0.0640 0.2804

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{106m}Ag			8.4 d	EC/		6+	3.71		0.3445 0.4434 Pd k x-ray 0.4510 0.5118 0.7173 1.0458
^{106}Ag		105.90667	24.0 m	β^+ /59 /2.965	/1.96	1+	+2.85		ann.rad./ 0.5119
^{107m}Ag			44.2 s	EC/41 / I.T./0.093		7/2+			Ag x-ray 0.0931
^{107}Ag	51.839(8)	106.905093				1/2-	-0.11357		
^{108m}Ag			$1.3x10^2$y	EC/92 / I.T./8 /0.079		6+	3.580		Ag k x-ray Pd k x-ray 0.43392 0.61427 0.72290
^{108}Ag		107.905954	2.39 m	β- /97/1.65 EC/2/ β- /1/1.92	1.02/1.7 1.65/96 0.88/0.3	1+	+2.6884		ann.rad./ 0.43392 0.61885 0.63298
^{109m}Ag			39.8 s	I.T./0.088		7/2+			Ag k x-ray 0.0880
^{109}Ag	48.161(8)	108.904756				1/2-	-0.13056		
^{110m}Ag			249.8 d	β- /99 / I.T./1 /0.1164	0.087 0.530	6+	+3.607		0.65774 0.76393 0.88467 0.93748 1.38427 (0.447-1.56)
^{110}Ag		109.906111	24.6 s	β- /2.892	2.22/5 2.89/95	1+	+2.7271		0.65774 0.8154 1.1257
^{111m}Ag			1.08 m	I.T./99 /0.0598 β- /1/		7/2+			Ag k x-ray 0.0598 0.2454
^{111}Ag		110.905295	7.47 d	β- /1.037	1.035/	1/2-	-0.146		0.2454 0.3421
^{112}Ag		111.90701	3.13 h	β- /3.96	3.94/ 3.4	2-	0.0547		0.6067 0.6174 1.3877 (0.4-2.9)
^{113m}Ag			1.14 m	I.T./80 /0.043 β- /20 /	 1.5	7/2+			0.1422 0.2983 0.3161 0.3923
^{113}Ag		112.90657	5.3 h	β- /2.02	2.01/	1/2-	0.159		0.2588 0.2986
^{114}Ag		113.90881	4.6 s	β- /5.08	4.9/	1+			0.5582 0.5760 1.9946
^{115m}Ag			18.7 s	β- /		7/2+			0.1134 0.1315 0.2288 0.3887

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{115}Ag		114.90876	20. m	β- /3.10		1/2-			0.1316 0.2128 0.2291 0.4727 (0.13-2.49)
^{116m}Ag			10.5 s	I.T./2 / β- /98 /	3.2/ 2.9	5+			0.1027 0.2549 0.5134 0.7055 1.0289
^{116}Ag		115.91137	2.68 m	β- /6.16	5.3	2-			0.5134 0.6993 2.4779
^{117m}Ag			5.3 s	β- /	3.2/	7/2+			0.1354 0.2981 0.3868
^{117}Ag		116.91171	1.22 m	β- /4.18	2.3	1/2-			0.1354 0.1571 0.3377
^{118m}Ag			2.8 s	β- /59 / I.T./41 /0.1277					0.1277 0.4878 0.6771 0.7709 1.0586
^{118}Ag		117.9145	4.0 s	β- /7.1					0.4878 0.6771 3.2259
^{119}Ag		118.9157	2.1 s	β- /5.35		7/2+			0.0674 0.3662 0.3991 0.6264
^{120m}Ag			0.32 s	β- / I.T./					0.2030 0.5059 0.6978 0.8300 0.9258
^{120}Ag		119.9188	1.23 s	β- /8.2					0.5059 0.6978 0.8171 1.3231
^{121}Ag		120.9198	0.78 s	β- /6.4					0.1150 0.3148 0.3537 0.3696 0.5007 1.5105 (0.11-2.5)
^{122m}Ag			1. s	β- /					
^{122}Ag		121.9233	0.44 s	β- /9.2					
^{123}Ag		122.9249	0.31 s	β- /7.4					
^{124}Ag		123.9285	0.22 s	β- /10.1					
^{125}Ag		124.9305	0.17 s						
^{126}Ag		125.9345	0.11 s						
^{127}Ag		126.9369	0.11 s						

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
$_{48}$Cd		**112.411(8)**							
^{97}Cd		96.9349	3. s	β^+,(p)					
^{98}Cd		97.9276	9.2 s	β^+ /5.4 (p)	/0.025				
^{99}Cd		98.9250	16. s	β^+ ,EC/6.9					ann.rad./
^{100}Cd		99.9203	1.1 m	β^+ ,EC/3.9					ann.rad./ (0.090-1.043)
^{101}Cd		100.9187	1.2 m	β^+ /83 /5.5 EC/17 /	4.5	5/2+			In k x-ray 0.0985 1.7225 0.31-2.84)
^{102}Cd		101.91474	5.8 m	β^+ /27 /2.59 EC/73		0+			ann.rad./ 0.0974 0.4810 1.0366 1.3598
^{103}Cd		102.91342	7.5 m	β^+ /33 /4.14 EC/67 /		5/2+	-0.81	-0.8	ann.rad./ Ag k x-ray 1.0799 1.4487 1.4618 (0.1-2.8)
^{104}Cd		103.90985	58. m	EC/1.14		0+			Ag k x-ray 0.0835 0.7093
^{105}Cd		104.90947	55.5 m	β^+ /26 /2.739 EC/74 /	1.69/	5/2+	-0.7393	+0.43	Ag k x-ray 0.3469 0.6072 0.9618 1.3025 (0.25-2.4)
^{106}Cd	1.25(6)	105.90646	>2.6x10^{17} y	β^+,EC		0+			
^{107}Cd		106.90661	6.52 h	EC/99+ /1.417 β^+ /		5/2+	-0.615055	+0.68	Ag k x-ray 0.0931 0.8289
^{108}Cd	0.89(3)	107.90418				0+			
^{109}Cd		108.904985	462.0 d	EC/0.214		5/2+	-0.827846	+0.69	Ag k x-ray 0.08804
^{110}Cd	12.49(18)	109.903006				0+			
^{111m}Cd			48.5 m	I.T./		11/2-			Cd k x-ray 0.1508(IT) 0.2454
^{111}Cd	12.80(12)	110.904182				1/2+	-0.594886		
^{112}Cd	24.13(21)	111.902758				0+			
^{113m}Cd			14.1 y	β- /99.9 /0.59	0.59/99.9	11/2-	-1.087		0.2637
^{113}Cd	12.22(12)	112.904401	7.7x10^{15}y	β^-		1/2+	-0.622301		
^{114}Cd	28.73(42)	113.903359				0+			
^{115m}Cd			44.6 d	β- /1.629	0.68/1.6 1.62/97	11/2-	-1.042		0.48450 0.93381 1.29064
^{115}Cd		114.905431	2.228 d	β- /1.446	0.593/42 1.11/58	1/2+	-0.648426		0.23141 0.26085 0.33624 0.49227

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.52780
^{116}Cd	7.49(18)	115.904756				0+			
^{117m}Cd			3.4 h	β- /2.66	0.72/	11/2-			0.1586 0.5529 0.37-2.42
^{117}Cd		116.907219	2.49 h	β- /2.52	0.67/51 2.2/10	1/2+			0.2209 0.2733 0.3445 1.3033
^{118}Cd		117.90692	50.3 m	β- /0.52		0+			
^{119m}Cd			2.20 m	β- /		11/2-			0.1056 0.7208 1.0250 2.0213
^{119}Cd		118.90992	2.69 m	β¨ /3.8	≈ 3.5/	1/2+			0.1340 0.2929 0.3429
^{120}Cd		119.90985	50.8 s	β- /1.76	1.5/	0+			
^{121m}Cd			8. s	β- /		11/2-			0.1008 0.9878 1.0209 1.1815 2.0594
^{121}Cd		120.9131	13.5 s	β- /4.9		(3/2+)			0.2102 0.3242 0.3492 1.0403
^{122}Cd		121.9135	5.3 s	β- /3.0		0+			
^{123m}Cd			1.9 s	β- /					
^{123}Cd		122.91770	2.09 s	β- /6.12		3+			
^{124}Cd		123.9177	1.24 s	β- /4.17		0+			0.0365 0.0628 0.1799
^{125m}Cd			0.66 s	β- /					
^{125}Cd		124.92129	0.68 s	β- /7.16		3/+			
^{126}Cd		125.9224	0.52 s	β- /5.49		0+			0.2601
^{127}Cd		126.9264	0.4 s	β- /8.5		3/+			
^{128}Cd		127.9278	0.28 s	β- /7.1		0+			0.247
^{129}Cd		128.9323	0.27 s	β- /5.9					0.281
^{130}Cd		129.9340	0.20 s	β- /		0+			
^{49}In		**114.818(3)**							
^{98}In		97.9422							
^{99}In		98.9346		β^+ /8.9					
^{100}In		99.9316	6. s	β^+,(p)/10.5					
^{101}In		100.9266	15. s	β^+ /7.3					
^{102}In		101.9243	22. s	EC/8.9		(5)			0.1566 0.7767 (0.397-0.923)
^{103m}In			34. s						
^{103}In		102.91991	1.1 m	β^+ ,EC/6.05	4.2	9/2+			ann.rad./ 0.1879 (0.157-3.98)
^{104m}In			16. s	IT/0.0935					

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{104}In		103.9183	1.84 m	β^+ ,EC/7.9	4.8	5+	+4.44	+0.7	ann.rad./ 0.6580 0.8341 0.8781
^{105m}In			43. s	I.T.		1/2-			In k x-ray 0.6740
^{105}In		104.91467	5.1 m	β^+ ,EC/4.85	3.7	9/2+	+5.675	+0.83	0.1310 0.2600 0.6038
^{106m}In			5.3 m	β^+ /85 / EC/15 /	4.90	3+			ann.rad./ 0.6326 0.8611 1.7164
^{106}In		105.91346	6.2 m	β^+ /65 /6.52 EC/35 /	2.6	7+	+4.92	+0.97	ann.rad./ 0.2259 0.6327 0.8611 0.9978 1.0091
^{107m}In			51. s	I.T./0.6786		1/2-			In k x-ray 0.6785
^{107}In		106.91029	32.4 m	β^+ /35 /3.43 E.C/65 /	2.20/	9/2+	+5.59	+0.81	ann.rad./ Cd k x-ray 0.2050 0.3209 0.5055 (0.2-2.99)
^{108m}In			57. m	β^+ /53 / EC/47 /	1.3	6+			ann.rad./ Cd k x-ray 0.6329 1.9863 3.4522
^{108}In		107.90971	40. m	β^+ /33 /5.15 EC/67 /	3.49/	3+	+4.56	+1.01	ann.rad./ Cd k x-ray 0.2429 0.6331 0.8756
^{109m}In			1.3 m	I.T./0.650		1/2-			In k x-ray 0.6498
^{109}In		108.90715	4.2 h	β^+ /8 /2.02 EC/92 /	0.79/	9/2+	+5.54	+0.84	ann.rad./ Cd k x-ray 0.2035 0.6235
^{110m}In			4.9 h	EC/		7+	+4.72	+1.00	Cd k x-ray 0.6577 0.8847 0.9375 (0.1-1.98)
^{110}In		109.90717	1.15 h	β^+ /62 /3.88 EC/38 /	2.22/	2+	+4.37	+0.35	ann.rad./ Cd k x-ray 0.6577 (0.6-3.6)
^{111m}In			7.7 m	I.T./0.537		1/2-	+5.53		In k x-ray 0.537
^{111}In		110.90511	2.8049 d	EC/0.866		9/2+	+5.50	+0.80	Cd k x-ray 0.1712

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{112m}In			20.8 m	I.T./0.155		4+			0.2453 In k x-ray
^{112}In		111.90553	14.4 m	β^+ /22 /2.586 EC/34 / β- /0.663		1+	+2.82	+0.09	0.1555 ann.rad./ Cd k x-ray 0.6171
^{113m}In			1.658 h	I.T./0.3917		1/2-	-0.210		In k x-ray 0.3917
^{113}In	4.29(5)	112.904062				9/2+	+5.529	+0.80	
^{114m}In			49.51 d	I.T./97 /0.190 EC/3 /		5+	+4.7		In k x-ray 0.19027
^{114}In		113.904918	1.198 m	β- /97 /1.989 EC/3 /1.453	1.984/	1+	+2.82		Cd k x-ray 0.5584 0.5727 1.2998
^{115m}In			4.486 h	I.T./95 /0.336 β- /5 /0.83		1/2-	-0.255		In k x-ray 0.3362 0.4974
^{115}In	95.71(5)	114.903879	$4.4x10^{14}$ y	β- /0.495		9/2+	+5.541	+0.81	
^{116m2}In			2.16 s	I.T./0.162		8-			In k x-ray 0.1624
^{116m1}In			54.1 m	β- /	1.0	5+	+4.3		0.13792 0.41688/27 1.09723/58.5 1.29349/85
^{116}In		115.905261	14.1 s	β- /3.274	3.3/99	1+	2.788	0.11	0.46313 1.2526 1.29349
^{117m}In			1.94 h	β- /53 /1.769 I.T./47 /	1.77/	1/2-	0.25		In k x-ray 0.15855 0.31531 0.55294
^{117}In		116.90452	44. m	β- /1.455	0.74/	9/2+	+5.52	+0.83	0.15855 0.3966 0.55294
^{118m2}In			8.5 s	I.T./98 / β- /2 /		(8-)			In k x-ray 0.1382
^{118m1}In			4.40 m	β- /	1.3 2.0	5+			0.2086 0.6833 1.2295
^{118}In		117.90636	5.0 s	β- /4.42	4.2/	1+			0.5282 1.1734 1.2295 2.0432
^{119m}In			17.9 m	β- /97 / I.T./3 /0.311	2.7/	1/2-			0.3114 0.7631
^{119}In		118.90585	2.3 m	β- /2.36	1.6/	9/2+	+5.52	+0.85	0.0239 0.6495 0.7631 1.2149
^{120m}In			47. s	β- /	2.2/	8-			0.7042 1.1725 2.0398 2.3902
^{120}In		119.90796	3.1 s	β- /5.37	5.6/	(1+)	+4.30	+0.81	0.4146

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
					3.1/				0.5924 0.8637 1.0232 1.1714 (0.4-2.7)
^{121m}In			3.8 m	β- /99 / I.T./1 /0.313	3.7/	1/2-			0.0601 0.3136 0.9256 1.0412 1.1022 1.1204
^{121}In		120.90785	23. s	β- /3.36	2.5	9/2+	+5.50	+0.81	0.2620 0.6573 0.9256
^{122m}In			10. s	β- /	4.4/	8-			1.0014 1.1403
^{122}In		121.91028	1.5 s	β- /6.37	5.3/	(1+)			0.2391 1.0014 1.1403 1.164 1.1903
^{123m}In			47. s	β- /	4.6/	(1/2-)	-0.40		0.1258 1.170 3.234
^{123}In		122.91044	6.0 s	β- /4.39	3.3/	(9/2+)	+5.49	+0.76	0.6188 1.0197 1.1305
^{124m}In			3.4 s	β-		8-	+3.89	+0.66	0.1029 0.9699 1.0729 1.1316
^{124}In		123.91318	3.18 s	β- /7.36	5/	3+	+4.04	+0.61	0.7070 0.9978 1.1316 3.2142 (0.3-4.6)
^{125m}In			12.2 s	β- /	5.5/	1/2-	-0.43		0.1876
^{125}In		124.91360	2.33 s	β- /5.42	4.1/	9/2+	+5.50	+0.71	0.4260 1.0318 1.3350
^{126m}In			1.53 s		4.9/	3+	+4.03	+0.49	0.9086 0.9696 1.1411
^{126}In		125.91646	1.63 s	β- /8.21	4.2/	8-	+4.06		0.1118 0.9086 1.1411
^{127m}In			3.73 s	β- /	6.4/	(1/2-)			0.2523 3.074
^{127}In		126.91734	1.14 s	β- /6.51	4.9/	(9/2+)	+5.52	+0.59	0.4680 0.6461 0.8051 1.5977
^{128m}In			0.7 s	β- /	5.4/	(8-)			1.8670 1.9739 (0.1205-2.12)

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{128}In		127.92017	0.80 s	β- /8.98	5.0/	3+			0.9352 1.1688 3.5198 4.2970
^{129m}In			1.23 s	β- /98 / n/2 /	≈ 7.5/	1/2-			0.3153 0.9067 1.2220
^{129}In		128.9217	0.63 s	β- /7.66	5.5/	9/2+			0.2853 0.7693 1.8650 2.1180
^{130m2}In			0.53 s	β- /	8.8/	5+			0.0892 0.7744 1.2212
^{130m1}In			0.51 s	β- /	6.1/	10-			0.0892 0.1298 0.7744 1.2212 1.9052
^{130}In		129.92486	0.29 s	β- /10.25	10.0/	1-			
^{131m2}In			0.3 s	β- /		(21/2+)			
^{131m1}In			0.35 s	β- /		(1/2-)			
^{131}In		130.9268	0.28 s	β- /9.18	6.4/	(9/2+)			0.3328 2.433
^{132}In		131.9323	0.20 s	β- /13.6	6.0/ 8.8/	(7-)			0.1320 0.2992 0.3747 4.0406
^{133}In		132.9383	0.18 s	β- ,(n)					
^{134}In		133.9447	0.14 s						(0.354-2.005)
$_{50}$Sn		**118.710(7)**							
^{100}Sn		99.9394	≈ 0.9 s	β^+ /7.3	3.4/				
^{101}Sn		100.9361	3. s	β^+ /9.					
^{102}Sn		101.9243	≈ 5 s	β^+ /5.8					
^{103}Sn		102.9281	7. s	β^+ /7.7					
^{104}Sn		103.9232	21. s	β^+, EC/4.5					
^{105}Sn		104.9214	28. s	β^+ /6.3					In-x-ray (0.2879-3.819)
^{106}Sn		105.91688	2.0 m	β^+ /20 /3.18 EC/80 /					ann.rad./ In k x-ray 0.3865 0.4772
^{107}Sn		106.9157	2.92 m	EC/5.0 β^+ /	1.2/				0.4218 0.6105 0.6785 1.0013 1.1290 1.542
^{108}Sn		107.91196	10.3 m	β^+ /1 /2.09 EC/99 /	0.36/	0+			In k x-ray 0.2724 0.3965 (0.105-1.68)
^{109}Sn		108.91129	18.0 m	β^+ /9 /3.85	1.52/	7/2+	-1.08	+0.3	ann.rad./

TABLE OF THE ISOTOPES

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				EC/91 /					In k x-ray 0.6498 1.0992
^{110}Sn		109.90785	4.1 h	EC/0.64		0+			In k x-ray 0.283
^{111}Sn		110.90774	35. m	β^+ /31 /2.45 EC/69 /	1.5/	7/2+	+0.61	+0.2	In k x-ray 0.7620 1.1530 1.9147
^{112}Sn	0.97(1)	111.904822				0+			
^{113m}Sn			21.4 m	I.T./92 /0.077 EC/8 /		7/2+			Sn k x-ray In x-ray 0.0774
^{113}Sn		112.905174	115.1 d	EC/1.036		1/2+	-0.879		In k x-ray 0.25511 0.39169
^{114}Sn	0.65(1)	113.902783				0+			
^{115}Sn	0.34(1)	114.903347				1/2+	-0.9188		
^{116}Sn	14.54(9)	115.901745				0+			
^{117m}Sn			13.60 d	I.T./0.3146		11/2-	-1.40	-0.4	Sn k x-ray 0.15856
^{117}Sn	7.68(7)	116.902955				1/2+	-1.0010		
^{118}Sn	24.22(9)	117.901608				0+			
^{119m}Sn			293. d	I.T./0.0896		11/2-	-1.4	0.21	Sn k x-ray 0.02387
^{119}Sn	8.59(4)	118.903311				1/2+	-1.0473		
^{120}Sn	32.59(9)	119.902199				0+			
^{121m}Sn			≈ 55. y	I.T./78 /0.006 β- /22 /	0.354/	11/2-			Sn k x-ray 0.03715
^{121}Sn		120.904239	1.128 d	β- /0.388	0.383/100	3/2+	0.698	-0.02	
^{122}Sn	4.63(3)	121.903441				0+			
^{123m}Sn			40.1 m	β- /1.428	1.26/99	3/2+			0.1603 0.3814
^{123}Sn		122.905723	129.2 d	β- /1.404	1.42/99.4	11/2-	-1.370	+0.03	0.1603 1.0302 1.0886
^{124}Sn	5.79(5)	123.905275				0+			
^{125m}Sn			9.51 m	β- /2.387	2.03/98	3/2+			0.3321 1.4040
^{125}Sn		124.907785	9.63 d	β- /2.364	2.35/82	11/2-	-1.35	+0.1	1.0671 (0.2-2.3)
^{126}Sn		125.90765	$2.1x10^5$y	β- /0.38	0.25/100	0+			0.0643 0.0876 0.4148 0.6663 0.6950
^{127m}Sn			4.15 m	β- /3.21	2.72/	3/2+			0.4909 1.3480 1.5640
^{127}Sn		126.91035	2.12 h	β- /3.20	2.42/ 3.2/	11/2-			0.8231 1.0956 (0.120-2.84)
^{128m}Sn			6.5 s	IT/0.091		(7-)			
^{128}Sn		127.91054	59.1 m	β- /1.27	0.48/ 0.63/	0+			0.4823 0.5573

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.6805
^{129m}Sn			6.9 m	β- /		11/2-			1.1611
^{129}Sn		128.9134	2.4 m	β- /4.0		3/2+			0.6456
^{130m}Sn			1.7 m	β- /		(7-)			0.1449
									0.8992
^{130}Sn		129.91386	3.7 m	β- /2.15	1.10/	0+			0.0700
									0.1925
									0.7798
^{131m}Sn			1.02m	β-/	3.4/	11/2-			0.3043
									0.4500
									0.7985
									1.2260
									(0.08-3.21)
^{131}Sn		130.9169	39. s	β- /4.64	3.8/	3/2+			see ^{131m} Sn
^{132}Sn		131.91775	40. s	β- /3.3	1.8/				0.0855
									0.2467
									0.3402
									0.8985
^{133}Sn		132.9236	1.44 s	β- /7.8	7.5/	7/2-			
^{134}Sn		133.9278	1.04 s	β- /6.8					
$_{51}$Sb		**121.760(1)**							
^{103}Sb		102.9401							
^{104}Sb		103.9363	0.5 s						
^{105}Sb		104.9315	1.1 s						
^{106}Sb		105.9288	0.6 s	β^+ /10.5					
^{107}Sb		106.9242	≈ 4.6 s	β^+ /7.9					(0.253-2.154)
^{108}Sb		107.9222	7.0 s	β^+ /9.5					(0.151-1.280)
^{109}Sb		108.91814	17. s	β^+ /6.38	4.42/	5/2+			ann.rad./
				EC/	4.67/				0.2467
					4.33/				0.6645
									0.9254
									1.0617
									1.4958
^{110}Sb		109.9175	24. s	β^+ /9.0	6.8/	3+			ann.rad./
				EC/					0.6365
									0.9847
									1.2117
									1.2433
^{111}Sb		110.91254	1.25 m	β^+ /87 /4.47	3.3/	5/2+			ann.rad./
				EC/13 /					0.1002
									0.1545
									0.4891
									1.0326
^{112}Sb		111.91240	51.4 s	β^+ /90 /7.06	4.75/	3+			ann.rad./
				EC/10 /					0.6700
									0.9909
									1.2571
									(0.3-3.6)
^{113}Sb		112.90937	6.7 m	β^+ /65 /3.91	2.42/	5/2+			ann.rad./
				EC/35 /					Sn k x-ray
									0.3324
									0.4980

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{114}Sb		113.9091	3.49 m	β^+ /78 /5.9 EC/22 /	3.4/	3+	1.7		ann.rad./ Sn k x-ray 0.8876 1.2999
^{115}Sb		114.90660	32.1 m	β^+ /67 /3.03 EC/33 /	1.51/	5/2+	+3.46	-0.4	ann.rad./ Sn k x-ray 0.4973
^{116m}Sb			1.00 h	β^+ /78 / EC/22 /	1.16/	8-			ann.rad./ Sn k x-ray 0.4073 0.5429 0.9725 1.2935 (0.0998-1.501)
^{116}Sb		115.90680	16. m	β^+ /50 /4.707 EC/50 /	1.3/ 2.3/	3+	2.72		ann.rad./ Sn k x-ray 0.93180 1.29354 (0.138-3.903)
^{117}Sb		116.90484	2.80 h	β^+ /2 /1.76 EC/98 /	0.57/	5/2+	+3.4		Sn k x-ray 0.1586
^{118m}Sb			5.00 h	EC/99 /		8-	2.3		Sn k x-ray 0.25368 1.05069 1.22964
^{118}Sb		117.905533	3.6 m	β^+ /74 /3.657 EC/26 /	2.65/	1+	2.5		ann.rad./ Sn k x-ray 1.22964
^{119}Sb		118.90395	38.1 h	EC/0.59		5/2+	+3.45	-0.4	Sn k x-ray 0.0239
^{120m}Sb			5.76 d	EC/		8-	2.34		Sn k x-ray 0.0898 0.19730 1.02301 1.17121
^{120}Sb		119.90508	15.89 m	β^+ /41 /2.68 EC/59 /	1.72/	1+	+2.3		ann.rad./ Sn k x-ray 0.7038 1.17121
^{121}Sb	57.21(5)	120.903822				5/2+	+3.363	-0.4	
^{122m}Sb			4.19 m	I.T./0.162		8-			Sb x-ray 0.0614 0.0761
^{122}Sb		121.90518	2.72 d	β- /98 /1.979 β^+ /2 /1.620	1.414/65 1.980/26	2-	-1.90	+0.9	0.56409 0.69277 1.14050 1.2569
^{123}Sb	42.79(5)	122.904216				7/2+	+2.550	-0.5	
^{124m2}Sb			20.3 m	I.T./0.035		8-			
^{124m1}Sb			1.6 m	I.T./80 / β- /20 /	1.2/ 1.7/	5+			0.4984 0.6027 0.6458 1.1010
^{124}Sb		123.905938	60.20 d	β- /2.905	0.61/52 2.301/23	3-	1.2	+1.9	0.60271/97.8 0.64583/7.4

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{125}Sb		124.905247	2.758 y	β- /0.767	0.13/30 0.302/45 0.62/13	7/2+	+2.63		0.72277/10.5 1.69094/48.2 (0.0274-2.808) 0.0355 0.17632 0.38044 0.42786 0.46336 0.60060 0.63595
^{126m2}Sb			11. s	I.T./		3-			L x-ray 0.0227
^{126m1}Sb			19.0 m	β- /86 / I.T./14 /	1.9	5+			0.4148 0.6663 0.6950
^{126}Sb		125.90725	12.4 d	β- /3.67	1.9	8-	1.3		0.2786 0.4148 0.6663 0.6950 0.7205
^{127}Sb		126.906914	3.84 d	β- /1.581	0.89/ 1.10/ 1.50/	7/2+	2.70		0.2524 0.2908 0.4121 0.4370 0.6857 0.7837
^{128m}Sb			10.1 m	β- /96 / I.T./4 /	2.6/	5+			0.3140 0.5941 0.7432 0.7539
^{128}Sb		127.90917	9.1 h	β- /4.38	2.3/	8-	1.3		0.2148 0.3141 0.5265 0.7433 0.7540
^{129m}Sb			17.7 m	β- /					0.4338 0.6578 0.7598
^{129}Sb		128.90915	4.40 h	β- /2.38	0.65/	7/2-	2.82		0.0278 0.1808 0.3594 0.4596 0.5447 0.8128 0.9146 1.0301
^{130m}Sb			6.5 m	β- /2.6	2.12/				0.1023 0.7934 0.8394
^{130}Sb		129.91155	38.4 m	β- /4.96	2.9/	8-			0.1823 0.3309 0.4680 0.7394 0.8394
^{131}Sb		130.9120	23.0 m	β- /3.2	1.31/	7/2+			0.6423

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
					3.0/				0.6579 0.9331 0.9434
^{132m}Sb			2.8 m	β- /	3.9/	4+			0.1034 0.3538 0.6968 0.9739 0.9896
^{132}Sb		131.91420	4.2 m	β- /5.29		8-			0.1034 0.1506 0.6968 0.9739
^{133}Sb		132.9152	2.5 m	β- /4.00	1.20/	7/2+	3.00		0.4235 0.6318 0.8165 1.0764
^{134m}Sb			10.4 s	β- /	6.1	7-			
^{134}Sb		133.9206	0.8 s	β- /8.4	8.4	0-			0.1152 0.2970 0.7063 1.2791
^{135}Sb		134.9252	1.71 s	β- /8.12		7/2+			1.127 1.279
^{136}Sb		135.9301	0.82 s	β- /9.3					
$_{52}$Te		**127.60(3)**							
^{106}Te		105.9377	0.06 ms	α/4.32					
^{107}Te		106.9350	3.1 ms	α/ 70/ β^+ ,EC/10.1	3.86(1)/				
^{108}Te		107.9295	2.1 s	α/68 / β^+ ,EC/32 /6.8	3.314(4)/	0+			
^{109}Te		108.9275	4.6 s	β^+ EC/96 /8.7 α/4 /	3.107(4)/				
^{110}Te		109.9224	19. s	β^+ ,EC/4.5		0+			ann.rad./ 0.2191 0.6059
^{111}Te		110.9211	19.3 s	β^+ ,EC/8.0		(7/2+)			ann.rad./ 0.267 0.322 0.341
^{112}Te		111.9171	2.0 m	β^+ ,EC/4.3		0+			ann.rad./ 0.2962 0.3727 0.4187
^{113}Te		112.9154	1.7 s	β^+ /85 /5.7 EC/15 /	4.5/	(7/2+)			ann.rad./ Sb k x-ray 0.8144 1.0181 1.1812
^{114}Te		113.9125	15. m	β^+ /40 /3.2 EC/60 /		0+			ann.rad./ Sb k x-ray 0.0838 0.0903
^{115m}Te			6.7 m	β^+ /45 /		(1/2+)			ann.rad./

TABLE OF THE ISOTOPES

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				EC/55 /					Sb k x-ray 0.7236 0.7704
^{115}Te		114.9116	5.8 m	β^+ /45 /4.6 EC/55 /	2.7/	7/2+			ann.rad./ Sb k x-ray 0.7236 1.3268 1.3806
^{116}Te		115.9084	2.49 h	EC/1.5		0+			(0.22-2.7) Sb k x-ray 0.0937
^{117}Te		116.90864	1.03 h	EC/75 /3.54 β^+ /25 /	1.78/	1/2+			ann.rad./ Sb k x-ray 0.9197 1.7164 2.3000
^{118}Te		117.90583	6.00 d	EC/0.28		0+			Sb k x-ray
^{119m}Te			4.69 d	EC/		11/2-	0.89		Sb k x-ray 0.15360 0.2705 1.21271
^{119}Te		118.90641	16.0 h	β^+ /2 /2.293 EC/98 /	0.627/	1/2+	0.25		ann.rad./ Sb k x-ray 0.6440 0.6998
^{120}Te	0.09(1)	119.90403				0+			
^{121m}Te			≈ 154. d	I.T.(89%) EC(11%)		11/2-			Te k x-ray 0.2122
^{121}Te		120.90494	16.8 d	EC/1.04		1/2+			Sb k x-ray 0.5076 0.5731
^{122}Te	2.55(12)	121.903056				0+			
^{123m}Te			119.7 d	I.T./0.247		11/2-	-0.93		Te k x-ray 0.1590/84.1
^{123}Te	0.89(3)	122.904271	2.4×10^{19} y	EC/0.051		1/2+	-0.73695		
^{124}Te	4.74(14)	123.902819				0+			
^{125m}Te			58. d	I.T./0.145		11/2-	-0.99	-0.06	Te k x-ray 0.0355
^{125}Te	7.07(15)	124.904424				1/2+	-0.8885		
^{126}Te	18.84(25)	125.903305				0+			
^{127m}Te			109. d	I.T./98 /0.088 β- /2 /0.77		11/2-	-1.04		Te k x-ray 0.0883
^{127}Te		126.905217	9.4 h	β- /0.698	0.696/	3/2+	0.64		0.3603
^{128}Te	31.74(8)	127.904462				0+			
^{129m}Te			33.6 d	I.T./63 /0.105 β- /37 /	 1.60/	11/2-			Te k x-ray 0.45984 0.6959
^{129}Te		128.906596	1.16 h	β- /1.498	0.99/9 1.45/89	3/2+	0.70	0.06	0.0278 0.45984 0.48728
^{130}Te	34.08(62)	129.906223	2.5×10^{21} y			0+			
^{131m}Te			1.35 d	β- /78 /2.4 I.T./22 /0.18	0.42/	11/2-	-1.04		0.0811 0.1021 0.14973 0.77369 0.79375

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									0.85225
^{131}Te		130.908522	25.0 m	β- /2.233	1.35/12	3/2+	0.70		0.14973
					1.69/22				0.45327
					2.14/60				0.49269
^{132}Te		131.90852	3.26 d	β- /0.493	0.215	0+			0.049725
									0.11198
									0.22830
^{133m}Te			55.4 m	β- /82 /	2.4/30	11/2-			Te k x-ray
				I.T./18 /0.334					0.0949
									0.1689
									0.3121
									0.3341
^{133}Te		132.9109	12.4 m	β- /2.9	2.25/25	3/2+			0.3121
					2.65				0.4079
									1.3334
^{134}Te		133.9116	42. m	β- /1.6	0.6/	0+			0.7672/29
					0.7/				0.0794-0.9255
^{135}Te		134.9165	19.0 s	β- /6.0	5.4/				0.267
					6.0				0.603
									0.870
^{136}Te		135.92010	17.5 s	β- /5.1	2.5/	0+			2.0779/25
									0.0873-3.235
^{137}Te		136.9253	2.5 s	β- /98 /6.9	6.8	7/2-			0.2436
				n/2 /					
^{138}Te		137.9292	1.4 s	β- /6.4					
^{53}I		**126.90447(3)**							
^{108}I		107.9436	0.04 s	α/91 /4.	3.95				
^{109}I		108.9382	0.11 ms	p					
^{110}I		109.9346	0.65 s	β^+ ,EC/83 /11.4					ann.rad./
				α/17 /≈3.6	3.457(10)/				
				p /11 /					
^{111}I		110.9303	2.5 s	β^+ ,E../8.5					ann.rad./
									0.2665
									0.3215
									0.3412
^{112}I		111.9280	3.4 s	β^+ ,EC/10.2					ann.rad./
									0.6889
									0.7869
^{113}I		112.9237	5.9 s	β^+ ,EC/7.6					ann.rad./
									0.4625/100
									0.6224/74
									0.0550-1.422
^{114}I		113.9219	2.1 s	β^+ ,EC/8.7					ann.rad./
									0.6826
									0.7088
^{115}I		114.9188	1.3 m	β^+ ,EC/6.7		5/2+			ann.rad./
									0.275
									0.284
									0.460
									0.709
^{116}I		115.9167	2.9 s	β^+ /97 /7.8	6.7/	1+			ann.rad./
				EC/3 /					0.5402
									0.6789

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^{117}I		116.9136	2.22 m	β^+ ,EC/4.7	3.2/	(5/2+)	3.1		ann.rad./ 0.2744 0.3259
^{118m}I			8.5 m	β^+ ,EC/ I.T.	4.9/	7-	4.2		ann.rad./ 0.104 0.5998 0.6052 0.6138
^{118}I		117.9134	14. m	β^+ ,EC/7.0		2-	2.0		ann.rad./ 0.5448 0.6052 1.3384
^{119}I		118.9102	19. m	β^+ /54 /3.5 EC/46 /	2.4/	(5/2+)	+2.9		ann.rad./ Te k x-ray 0.2575
^{120m}I			53. m	β^+ /80 / EC/20 /	3.8		4.2		ann.rad. Te k x-ray 0.4257 0.5604 0.6147 1.3459
^{120}I		119.91005	1.35 h	β^+ /81 /5.62 EC/19 /	4.03 4.60	2-	1.23		ann.rad./ Tek x-ray 0.5604 0.6411 1.5230 (0.43-3.1)
^{121}I		120.90737	2.12 h	β^+ /13 /2.27 EC/87 /	1.2/	5/2+	2.3		ann.rad./ Te k x-ray 0.2122 (0.14-1.1)
^{122}I		121.90760	3.6 m	β^+ /4.234 EC/	3.1/	1+	0.94		ann.rad./ Te k x-ray 0.5641
^{123}I		122.905605	13.2 h	EC/1.242		5/2+	2.82		Te k x-ray 0.1590
^{124}I		123.906211	4.18 d	β^+ /23 /3.160 EC/77 /	1.54/ 2.14/ 0.75/	2-	1.44		ann.rad./ Te k x-ray 0.6027/62.9 0.7228/10.3 1.6910/11.2 (0.31-1.73)
^{125}I		124.904624	59.4 d	EC/0.1861		5/2+	2.82	-0.89	Te k x-ray 0.0355
^{126}I		125.905619	13.0 d	EC/ β^+ /2.155 β- /1.258	 1.13/ 0.87/ 1.25/	2-	1.44		ann.rad./ Te k x-ray 0.3887 0.6622
^{127}I	100.	126.904468				5/2+	+2.8133	-0.79	
^{128}I		127.905805	25.00 m	β- /2.118 EC/1.251	2.13/	1+			Te k x-ray 0.44287 0.52658
^{129}I		128.904988	$1.7x10^7$ y	β- /0.194	0.15/	7/2+	+2.621	-0.55	Xe k x-ray 0.0396
^{130m}I			9.0 m	I.T./83 /0.048		2+			I k x-ray

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^{130}I		129.906674	12.36 h	β- /17 / β- /2.949	1.04/ 0.62	5+	3.35		0.5361 0.4180 0.5361 0.6685 0.7395
^{131}I		130.906125	8.040 d	β- /0.971	0.606/	7/2+	+2.742	-0.40	0.08017 0.28431 0.36446 0.63699
^{132m}I			1.39 h	IT		8-			
^{132}I		131.90800	2.28 h	β- /14 /3.58 I.T./86 /	0.80/ 1.03/ 1.2/ 1.6/ 2.16/	4+	3.09	0.09	I k x-ray 0.0980 0.5059 0.52264 0.63019 0.6506 0.66768 0.77260 0.95457
^{133m}I			9. s	I.T./1.63		19/2-			I kx-ray 0.0730 0.6474 0.9126
^{133}I		132.90781	20.8 h	β- /1.77	1.24/85	7/2+	+2.86	-0.27	0.51056 0.52989 0.87537
^{134m}I			3.7 m	I.T./98 /0.316 β- /2 /		8-			I k x-ray 0.0444 0.2719
^{134}I		133.9099	52.6 m	β- /4.2	1.2/	4+			0.1354 0.84702 0.88409
^{135}I		134.91005	6.57 h	β- /2.65	0.9/ 1.3/	7/2+			0.2884 0.41768 0.52658 1.13156 1.26046
^{136m}I			47. s	β- /	4.7/ 5.2/	6-			0.1973 0.3468 0.3701 0.3814 1.3130 (0.16-2.36)
^{136}I		135.91466	1.39 m	β- /6.93	4.3/ 5.6/	2-			0.3447 1.3130 1.3211 2.2896 (0.3-6.1)
^{137}I		136.91787	24.5 s	β- /5.88	5.0/	(7/2+)			0.6010 1.2180 1.2201 1.3026 1.5343 (0.25-4.4)
^{138}I		137.9224	6.5 s	β- /7.8	6.9/	2-			0.4836

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
					7.4/				0.5888 0.8752 (0.4-5.3)
^{139}I		138.92609	2.30 s	β- /6.81 n/					0.192 0.198 0.273 0.382 0.386 0.468 0.683 1.313
^{140}I		139.9310	0.86 s	β- /8.8 n/		(3)			0.372 0.377 0.457
^{141}I		140.9351	0.45 s	β- /7.8					
^{142}I		141.9402	≈ 0.2 s	β-					
$_{54}$Xe		**131.29(2)**							
^{110}Xe		109.9445	0.2 s	β^+ /9.2					
^{111m}Xe			0.9 s	EC,β^+					
^{111}Xe		110.9416	0.7 s	EC,β^+ /10.6 α/	3.58(1)/				
^{112}Xe		111.9357	3. s	EC,β^+ /7.2 α/0.8 /					
^{113}Xe		112.9334	2.8 s	EC,β^+ /9.1					
^{114}Xe		113.9281	10.0 s	β^+ ,EC/5.9		0+			ann.rad./ 0.1031 0.1616 0.3085 0.6826 0.7088
^{115}Xe		114.9270	18. s	β^+ ,EC/7.6		(5/2+)			ann.rad./
^{116}Xe		115.9214	56. s	β^+ ,EC/4.3	3.3/	0+			ann.rad./ 0.1042 0.1916 0.2477 0.3107 0.4127
^{117}Xe		116.9206	1.02 m	β^+ ,EC/6.5		(5/2+)			ann.rad./ 0.2214 0.5190 0.6389 0.6613
^{118}Xe		117.917	≈ 4. m	β^+ ,EC/3.	2.7/	0+			ann.rad./ 0.0535 0.0600 0.1199
^{119}Xe		118.9156	5.8 m	β^+ ,EC/5.0	3.5/	7/2+	0.6		0.0873 0.1000 0.2318 0.4615
^{120}Xe		119.91216	40. m	β^+ ,EC/97 /1.96 β^+ /3 /		0+			I k x-ray 0.0251 0.0726 0.1781

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{121}Xe		120.91138	39. m	β^+ /44 /3.73 EC/56 /	2.8/	5/2+	0.65		(0.1-1.03) ann.rad./ I k x-ray 0.1328 0.2527 0.4452
^{122}Xe		121.9086	20.1 h	EC/0.9		0+			(0.1-3.1) I k x-ray 0.3501
^{123}Xe		122.90848	2.00 h	β^+ /23 /2.68 EC/77 /	1.51/	1/2+			ann.rad./ I k x-ray 0.1489 0.1781
^{124}Xe	0.09(1)	123.905895							(0.1-2.1)
^{125m}Xe			57. s	I.T./0.252		(9/2-)			Xe k x-ray 0.1111 0.141
^{125}Xe		124.906398	17.1 h	EC/1.653	0.47/	1/2+			I k x-ray 0.1884 0.2434
^{126}Xe	0.09(1)	125.90427				0+			
^{127m}Xe			1.15 m	I.T./0.297		(9/2-)			Xe k x-ray 0.1246 0.1725
^{127}Xe		126.905179	36.4 d	EC/0.662		1/2+	-0.504		I k x-ray 0.1721 0.2029 0.3750
^{128}Xe	1.92(3)	127.903531				0+			
^{129m}Xe			8.89 d	I.T./0.236		11/2-			Xe k x-ray 0.0396 0.1966
^{129}Xe	26.44(24)	128.904780				1/2+	-0.7780		
^{130}Xe	4.08(2)	129.903509				0+			
^{131m}Xe			11.9 d	I.T./0.164		11/2-	+0.6908		Xe k x-ray 0.16398
^{131}Xe	21.18(3)	130.905083				3/2+	+0.69186	-0.12	
^{132}Xe	26.89(6)	131.904155				0+			
^{133m}Xe			2.19 d	I.T./0.233		11/2-	-1.082		Xe k x-ray 0.23325
^{133}Xe		132.905906	5.243 d	β- /0.427	0.346/99	3/2+	+0.813	+0.14	Cs k x-ray 0.080998 0.1606
^{134}Xe	10.44(10)	133.905395				0+			
^{135m}Xe			15.3 m	I.T./		11/2-	1.103		Xe k x-ray 0.52658
^{135}Xe		134.90721	9.10 h	β- /1.15	0.91/	3/2+	0.903		0.24975 0.60807
^{136}Xe	8.87(16)	135.90722				0+			
^{137}Xe		136.91156	3.82 m	β- /4.17	4.1/ 3.6/	7/2-			0.45549 0.8489 0.9822 1.2732 1.7834 2.8498

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{138}Xe		137.91399	14.1 m	β- /2.77	0.8/ 2.4/	0+			0.1538 0.2426 0.2583 0.4345 1.76826 2.0158
^{139}Xe		138.91879	39.7 s	β- /5.06	4.5/ 5.0/				0.1750 0.2186 0.2965 (0.1-3.37)
^{140}Xe		139.9216	13.6 s	β- /4.1	2.6	0+			0.0801 0.6220 0.8055 1.4137 (0.04-2.3)
^{141}Xe		140.9267	1.72 s	β- /6.2	6.2/	5/2+			0.1187 0.9095 (0.05-2.55)
^{142}Xe		141.9297	1.22 s	β- /5.0	3.7/ 4.2/	0+			0.0338 0.0729 0.2038 0.3091 0.4145 0.5382 0.5718 0.6181 0.6448
^{143m}Xe			0.96 s	β-					
^{143}Xe		142.9352	0.30 s	β- /7.3					
^{144}Xe		143.9385	1.2 s	β- /6.1					
^{145}Xe		144.9437	0.9 s	β- ,(n)					
$_{55}$Cs		**132.90545(2)**							
^{112}Cs		111.9503	0.5 ms	p	0.81				
^{113}Cs		112.9445	17. μs	p	0.96				
^{114}Cs		113.9408	0.58 s	β^+ ,EC/11.8		1+			ann.rad./ 0.6826 0.7088
^{115}Cs		114.9359	≈ 1.4 s	β^+ ,EC/8.4					ann.rad./
^{116m}Cs			0.7 s	β ,EC/					ann.rad./ 0.3935
^{116}Cs		115.9330	3.8 s	β^+ ,EC/10.8					ann.rad./ 0.3935 0.5243 0.6151 0.6223
^{117m}Cs			6.5 s	β^+ ,EC/					
^{117}Cs		116.9286	≈ 8.4 s	β^+ ,EC/7.5					ann.rad./
^{118m}Cs			17. s	β^+ ,EC/					
^{118}Cs		117.92654	14. s	β^+ ,EC/9.		2			ann.rad./ 0.3372 0.4727 0.5865 0.5906

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{119m}Cs			28. s			3/2			
^{119}Cs		118.92234	38. s	β^+ ,EC/6.3		9/2+	+5.5	+2.8	ann.rad./ 0.169 0.176 0.224 0.257
^{120m}Cs			60. s	β^+ ,EC/					
^{120}Cs		119.92066	64. s	β^+ ,EC/7.92		2+	+3.87	+1.45	ann.rad./ 0.3224 0.4735 0.5534 (0.3-3.28)
^{121m}Cs			2.0 m	I.T./60 / β^+ /40 /	4.4	(9/2+)	+5.41	+2.7	ann.rad./ 0.1794 0.1961
^{121}Cs		120.91718	2.3 m	β^+ ,EC/5.40	4.38/	3/2+	+0.77	+0.84	ann.rad./ 0.1537 (0.08-0.56)
^{122m2}Cs			4.4 m	β^+ ,EC		8-	+4.77	+3.3	ann.rad./
^{122m1}Cs			0.36 s	IT					0.3311 0.4971 0.6385 (0.27-2.22)
^{122}Cs		121.91614	21. s	β^+ ,EC/7.1	5.8/	(1+)	-0.133	-0.19	ann.rad./ 0.3311 0.5120 0.8179
^{123m}Cs			1.6 s	I.T./		11/2-			Cs k x-ray 0.0946
^{123}Cs		122.91299	5.87 m	β^+ /75 /4.20 EC/25 /	3.0/	1/2+	+1.38		ann.rad./ Xe k x-ray 0.0974 0.5964
^{124m}Cs			6.3 s	IT		7+			
^{124}Cs		123.91225	30. s	β^+ /92 /5.92 EC/8 /	≈ 5.	1+	+0.673	-0.74	ann.rad./ Xe k x-ray 0.3539 0.4925 0.9418
^{125}Cs		124.90972	45. m	β^+ /40 /3.09 EC/60 /	2.06/	1/2+	+1.41		ann.rad./ Xe k x-ray 0.112 0.526
^{126}Cs		125.90945	1.64 m.	β^+ /81 /4.83 EC/19 /	3.4 3.7/	1+	+0.78	-0.68	ann.rad./ Xe k x-ray 0.3886 0.4912 0.9252
^{127}Cs		126.90741	6.2 h	β^+ /96 /2.08 EC/4 /	0.65/ 1.06	1/2+	+1.46		Xe k x-ray 0.1247 0.4119
^{128}Cs		127.90775	3.62 m	β^+ /68 /3.930 EC/32 /	2.44/ 2.88/	1+	+0.97	-0.57	ann.rad./ Xe k x-ray

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{129}Cs		128.90606	1.336 d	EC/1.195		1/2+	+1.49		0.4429 Xe k x-ray 0.3719 0.4115
^{130m}Cs			3.5 m	IT,β^+ ,EC		5-			
^{130}Cs		129.90671	29.21 m	β^+ /55 /2.98 EC/43 / β- /1.6 /0.37	1.98/ 0.44/1.6	1+	+1.46	-0.06	ann.rad./ Xe k x-ray 0.5361
^{131}Cs		130.90546	9.69 d	EC/0.352		5/2+	+3.54	-0.58	Xe k x-ray
^{132}Cs		131.906430	6.48 d	EC/98 / β^+ /0.3 /2.120 β- / /1.280		2-	+2.22	+0.51	Xe k x-ray 0.4646 0.6302 0.66769
^{133}Cs	100.	132.905447				7/2+	+2.582	-0.0037	
^{134m}Cs			2.91 h	I.T./0.139		8-	+1.098	+1.0	Cs k x-ray 0.12749
^{134}Cs		133.906714	2.065 y	β- /2.059 EC/1.22	0.089/27 0.658/70	4+	+2.994	+0.39	0.56327 0.56935 0.60473 0.79584
^{135m}Cs			53. m	I.T./1.627		19/2-	+2.18	+0.9	0.7869 0.8402
^{135}Cs		134.905972	2.3x10^6 y	β- /0.269	0.205/100	7/2+	+2.732	+0.05	
^{136m}Cs			19. s	I.T./		8			
^{136}Cs		135.907307	13.16 d	β- /2.548	0.341/	5+	+3.71	+0.2	0.06691 0.34057 0.81850 1.04807
^{137}Cs		136.907085	30.2 y	β- /1.176	0.514/95	7/2+	+2.84	+0.05	Ba k x-ray 0.66164
^{138m}Cs			2.9 m	I.T./75 /0.080 β- /25 /	 3.3	6-	+1.71	-0.40	Cs k x-ray 0.0799 0.1917 0.4628 1.43579
^{138}Cs		137.91101	32.2 m	β- /5.37	2.9/	3-	+0.700	+0.12	0.1381 0.46269 1.00969 1.43579 2.21788
^{139}Cs		138.913359	9.3 m	β- /4.213	4.21	7/2+	+2.70	-0.07	0.6272 1.2832 (0.4-3.66)
^{140}Cs		139.91727	1.06 m	β- /6.22	5.7/ 6.21/	1-	+0.13390	-0.11	0.5283 0.6023 0.9084 (0.41-3.94)
^{141}Cs		140.92005	24.9 s	β- /5.26	5.20/	7/2+	+2.44	-0.4	Ba k x-ray 0.0485 0.5616 0.5887 1.1940 (0.05-3.33)
^{142}Cs		141.92430	1.8 s	β- /7.31	6.9/ 7.28				0.3596 0.9668

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									1.1759
									1.3265
^{143}Cs		142.92732	1.78 s	β- /6.24	6.1	(3/2+)	+0.87	+0.47	0.1955
									0.2324
									0.3064
									(0.17-1.98)
^{144}Cs		143.93203	1.01 s	β- /8.47	8.46/	1	-0.546	+0.30	0.1993
					7.9/				0.5598
									0.6392
									0.7587
^{145}Cs		144.93541	0.59 s	β- /7.89	7.4/	3/2+	+0.784	+0.6	0.1126
					7.9/				0.1755
									0.1990
^{146}Cs		145.94024	0.322 s	β- ,(n)/9.38	≈ 9.0	2-			
^{147}Cs		146.9439	0.227 s	β- ,(n)/9.3					
^{148}Cs		147.9490	0.15 s	β- ,(n)/10.5					
$_{56}$Ba		**137.327(7)**							
^{114}Ba		113.9509	0.43 s	β^+,(p)	p/20				
^{115}Ba		114.948	0.45 s	β^+,(p)	p/<15				
^{116}Ba		115.9417	1.3 s	β^+,(p)	p/3				
^{117}Ba		116.9377	1.8 s	β^+,(p),EC/8.4	p/13	(3/2-)			(0.0457-0.364)
^{118}Ba		117.9466	5.2 s	β^+,					(0.040-0.156)
^{119}Ba		118.931	5.4 s	β^+ ,EC/8.					
^{120}Ba		119.9260	24. s	β^+ ,EC/5.0		0+			ann.rad./
									0.140
									(0.075-0.146)
^{121}Ba		120.9245	30. s	β^+ ,EC/6.8		5/2	+0.660	+1.8	ann.rad./
^{122}Ba		121.9203	2.0 m	β^+ ,EC/3.8		0+			ann.rad./
^{123}Ba		122.9189	2.7 m	β^+ ,EC/5.5			-0.68	+1.5	ann.rad./
									0.0306
									0.0927
									0.1161
									0.1235
^{124}Ba		123.91509	12. m	β^+ ,EC/2.65					ann.rad./
									0.1695
									0.1888
									1.2160
^{125m}Ba			8. m	β^+ ,EC/	4.5				
^{125}Ba		124.9146	3.5 m	β^+ ,EC/4.6	3.4	1/2+	+0.18		ann.rad./
									0.0550
									0.0776
									0.0854
									0.1409
^{126}Ba		125.91124	1.65 h	β^+ /2 /1.67		0+			Cs k x-ray
				EC/98 /					0.2179
									0.2336
									0.2576
^{127}Ba		126.9111	12.9 m	β^+ /54 /3.5		1/2+	+0.09		ann.rad./
				EC/46 /					Cs k x-ray
									0.1148
									0.1808
									(0.07-2.5)
^{128}Ba		127.90831	2.43 d	EC/0.52		0+			Cs k x-ray

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{129m}Ba			2.17 h	EC/98 / β^+ /2 /		7/2+			0.27344 Cs k x-ray 0.1769 0.1823 0.2023 1.4593
^{129}Ba		128.90868	2.2 h	β^+ /20 /2.43 EC/80 /	1.42/	1/2+	-0.40		ann.rad./ Cs k x-ray 0.1291 0.2143 0.2208
^{130}Ba	0.106(1)	129.90631				0+			
^{131m}Ba			14.6 m	I.T./0.187		9/2-	-0.87	+1.5	Ba k x-ray 0.1085
^{131}Ba		130.90693	11.7 d	EC/1.37		1/2+	0.7081		Cs k x-ray 0.12381/28.4 0.21608/21.3 0.49636/42.9 (0.0549-1.171)
^{132}Ba	0.101(1)	131.905056				0+			
^{133m}Ba			1.621 d	I.T./0.288		11/2-	-0.91	+0.9	Ba k x-ray 0.2761
^{133}Ba		132.906003	10.53 y	EC/0.517		1/2+	0.7717		Cs k x-ray 0.08099 0.35600
^{134}Ba	2.417(18)	133.904504				0+			
^{135m}Ba			1.20 d	I.T./0.2682		11/2-	-1.00	+1.0	Ba k x-ray 0.2682
^{135}Ba	6.592(12)	134.905684				3/2+	+0.838	+0.16	
^{136m}Ba			0.308 s	I.T./2.0305		7-			Ba k x-ray 0.8185 1.0481
^{136}Ba	7.854(24)	135.904571				0+			
^{137m}Ba			2.552 m	I.T./0.6617		11/2-	-0.99	+0.8	Ba k x-ray 0.66164
^{137}Ba	11.232(24)	136.905822				3/2+	+0.9374	+0.245	
^{138}Ba	71.698(42)	137.905242				0+			
^{139}Ba		138.908836	1.396 h	β- /2.317	2.14/27 2.27/72	7/2-	-0.97	-0.57	0.16585 1.2544 1.42033
^{140}Ba		139.91060	12.75 d	β- /1.05	0.48 1.0/ 1.02/	0+			0.16268 0.30485 0.53727
^{141}Ba		140.91441	18.3 m	β- /3.22	2.59/ 2.73/	3/2-	-0.34	+0.45	0.1903 0.2770 0.3042 (0.1-2.5)
^{142}Ba		141.91645	10.7 m	β- /2.212	1.0/ 1.10/	0+			0.23152 0.25512 0.3090 1.2040
^{143}Ba		142.92061	14.3 s	β- /4.24	4.2/	5/2+	+0.44	-0.88	0.1786 0.21148 0.7988 (0.17-2.4)
^{144}Ba		143.92294	11.4 s	β- /3.1	2.4/	0+			La k x-ray

TABLE OF THE ISOTOPES

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					2.9/				0.10386 0.1566 0.1728 0.3882 0.43048
^{145}Ba		144.9269	4.0 s	β- /4.9	4.9/	(5/2-)	-0.28	+1.22	La k x-ray 0.0918 0.09709
^{146}Ba		145.9302	2.20 s	β- /4.12	3.9/	0+			0.0644 0.2513 0.3270 0.3329 0.3622
^{147}Ba		146.9340	0.892 s	β- /5.75	5.5/				
^{148}Ba		147.9377	0.64 s	β- ,n/5.11					
^{149}Ba		148.9421	0.36 s	β- ,(n)/7.3					
$_{57}$La		**138.9055(2)**							
^{120}La		119.938	2.8 s	EC,β^+ /11.					
^{121}La		120.9330	5.3 s						
^{122}La		121.9307	9. s	EC,β^+ /≈ 9.7					
^{123}La		122.9262	17. s	EC /7.					
^{124}La		123.9245	30. s	EC/≈ 8.8		(7+)			
^{125}La		124.9207	1.2 m	β^+ ,EC/5.6		11/2-			ann.rad./ 0.0436 0.0676
^{126}La		125.9194	1.0 m	β^+ ,EC/7.6					ann.rad./ 0.2561 0.340 0.4555 0.6214
^{127}La		126.9162	3.8 m	β^+ ,EC/4.7		3/2+			ann.rad./ 0.025 0.0562
^{128}La		127.9155	5.0 m	β^+ /80 /6.7 EC/20 /		(5-)			ann.rad./ Ba k x-ray 0.2841/87 0.4793/54 (0.315-2.212)
^{129m}La			0.56 s	IT		(11/2-)			
^{129}La		128.91267	11.6 m	β^+ /58 /3.72 EC/42 /	2.42/	3/2+			ann.rad./ Ba k x-ray 0.1105 0.2786 (0.1-1.8)
^{130}La		129.9123	8.7 m	β^+ /78 /5.6 EC/22 /		3+			ann.rad./ Ba k x-ray 0.3573/81 0.5506/27 (0.1965-1.989)
^{131}La		130.9101	59. m	β^+ /76 /3.0 EC/24 /	1.42/ 1.94/	3/2+			ann.rad./ Ba k x-ray 0.1085 0.3658

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{132m}La			24. m	I.T./76 / β^+,EC/24 /		6-			0.5263 La k x-ray 0.1352 0.4645
^{132}La		131.91011	4.8 h	β^+ /40 /4.71 EC/60 /	2.6/ 3.2 3.7/	2-			0.4645 ann.rad./ Ba k x-ray
^{133}La		132.9084	3.91 h	β^+ /4 /2.2 EC/96 /	1.2/	5/2+			0.5671 Ba k x-ray 0.2788 0.2901
^{134}La		133.90849	6.5 m	β^+ /63 /3.71 EC/37/	2.67/	1+			0.3024 ann.rad./ Ba k x-ray 0.6047 (0.5-1.9)
^{135}La		134.90697	19.5 h	EC/1.20		5/2+			Ba k x-ray 0.4805
^{136}La		135.9077	9.87 m	β^+ /36 /2.9 EC/64 /	1.8/	1+			ann.rad./ Ba k x-ray 0.8185
^{137}La		136.90647	$6x10^4$ y	EC/0.60		7/2+	+2.70	+0.2	0.2836
^{138}La	0.090(1)	137.907107	$1.06x10^{11}$ y			5+			1.4358/65 0.7887/35
^{139}La	99.910(1)	138.906349				7/2+			
^{140}La		139.909473	1.678 d	β- /3.762	1.35 1.24/ 1.67/	3-			
^{141}La		140.910958	3.90 h	β- /2.502	2.43/	7/2+			
^{142}La		141.91408	1.54 h	β- /4.505	2.11/ 2.98/ 4.52/	2-			
^{143}La		142.91606	14.1 m	β- /3.43	3.3/	7/2-			
^{144}La		143.9196	40.7 s	β- /5.5	4.1/				
^{145}La		144.9217	24. s	β- /4.1	4.1/	3/2+			
^{146m}La			10.0 s	β- /6.7	5.5/	(6)			
^{146}La		145.9258	6.3 s	β- /6.6	6.2/	(2-)			
^{147}La		146.9278	4.02 s	β- /5.0	4.6/				
^{148}La		147.9322	1.1 s	β- /7.26		2-			
^{149}La		148.9342	1.10 s	β- /5.5					
^{150}La		149.9386	0.51 s						x-ray (0.097-0.209)
$_{58}$Ce		**140.116(1)**							
^{121}Ce		121.944	1.1 s	β^+,p					
^{123}Ce		122.936	3.8 s	β^+ ,EC/≈8.6					ann.rad./
^{124}Ce		123.931	6. s	EC /≈5.6					
^{125}Ce		124.929	10. s	β^+ ,EC/7.		(5/2+)			ann.rad./
^{126}Ce		125.9241	50. s	EC/4.					
^{127}Ce		126.9228	32. s	β^+ ,EC/6.1					ann.rad./ (0.058-1.148)
^{128}Ce		127.9189	4.1 m	β^+ ,EC/3.2					ann.rad./ (0.023-0.880)
^{129}Ce		128.9187	3.5 m	β^+ ,EC/5.6					ann.rad./

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{130}Ce		129.9147	26. m	β^+ ,EC/2.2		0+			(0.0675-1.015) ann.rad./ La k x-ray
^{131m}Ce			5. m	β^+ ,EC/					(0.047-1.431) ann.rad./ 0.2304 0.3955 0.4213
^{131}Ce		130.9144	10. m	β^+ ,EC/4.0	2.8/				ann.rad./ 0.119 0.169 0.414
^{132}Ce		131.9115	3.5 h	EC/1.3		0+			La k x-ray 0.1554 0.1821
^{133m}Ce			1.6 h	β^+ ,EC/		1/2+			ann.rad./ 0.0769 0.0973 0.5577
^{133}Ce		132.9116	5.4 h	β^+ /8 /2.9 EC/92 /	1.3/	9/2-			ann.rad./ La k x-ray 0.0584 0.1308 0.4722 0.5104
^{134}Ce		133.9090	3.16 d	EC/0.5		0+			La k x-ray 0.1304 0.1623 0.6047
^{135m}Ce			20. s	I.T./0.446		11/2-			Ce k x-ray 0.0826 0.1497 0.2134
^{135}Ce		134.90915	17.7 h	β^+ /1 /2.026 EC/99 /	0.8/	1/2+			La k x-ray 0.0345 0.2656 0.3001 0.6068
^{136}Ce	0.19(1)	135.90714				0+			
^{137m}Ce			1.43 d	I.T./99 /0.254 EC/0.8 /		11/2-	0.70		Ce k x-ray 0.1693 0.2543
^{137}Ce		136.90778	9.0 h	β^+ /1.222		3/2+	0.9		La k x-ray 0.4472
^{138}Ce	0.25(1)	137.90599				0+			
^{139m}Ce			56.4 s	I.T./0.7542		11/2-			Ce k x-ray 0.7542
^{139}Ce		138.90665	137.6 d	EC/0.28		3/2+	0.9		La k x-ray 0.16585
^{140}Ce	88.48(10)	139.905435				0+			
^{141}Ce		140.908272	32.50 d	β- /0.581	0.436/69 0.581/31	7/2-	1.1		Pr k x-ray 0.14544/48.0
^{142}Ce	11.08(10)	141.909241				0+			
^{143}Ce		142.912382	1.38 d	β- /1.462	1.404/ 1.110/47	3/2-	$\approx$ 1.		Pr k x-ray 0.0574 0.2933

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{144}Ce		143.913643	284.6 d	β- /0.319	0.185/20 0.318/	0+			Pr k x-ray 0.0801 0.1335
^{145}Ce		144.91723	3.00 m	β- /2.54	1.7/24 1.3	3/2-			Pr k x-ray 0.0627 0.7245
^{146}Ce		145.9187	13.5 m	β- /1.04	0.7/90	0+			Pr k x-ray 0.0986 0.2182 0.3167
^{147}Ce		146.9225	56. s	β- /3.29	3.3/				0.0930 0.2687
^{148}Ce		147.9244	56. s	β- /2.1	1.66/	0+			0.0904 0.0985 0.1212 0.2918
^{149}Ce		148.9283	5.2 s	β- /4.2					0.0577 0.0864 0.3800
^{150}Ce		149.9302	4.4 s	β- /3.0					0.1099
^{151}Ce		150.9340	1.0 s	β- /5.3					0.0526
^{152}Ce		151.9366	1.4 s	β- /4.4					Pr k x-ray 0.098 0.115
^{59}Pr		**140.90765(2)**							
^{124}Pr		123.943	1.2 s	β^+ ,EC/12.					ann.rad./
^{125}Pr		124.9378	≈ 3.3 s	β^+					ann.rad./ 0.1358
^{126}Pr		125.9353	3.1 s	β^+ ,EC/≈10.4					ann.rad./ (0.170-0.985)
^{127}Pr		126.9308	4.2 s	β^+ /≈7.5					ann.rad./ (0.0288-0.8949)
^{128}Pr		127.9288	3.2 s	β^+ ,EC/≈9.3					ann.rad./
^{129}Pr		128.9249	32 s	β^+ ,EC/5.8					ann.rad./ (0.0395-1.865)
^{130}Pr		129.9234	40. s	β^+ ,EC/8.1					ann.rad./
^{131m}Pr			5.7 s						(0.06-0.16)
^{131}Pr		130.9201	1.7 m	β^+ ,EC/5.3				≈5.5	ann.rad./ (0.059-0.980)
^{132}Pr		131.9191	1.6 m	β^+ ,EC/7.1					ann.rad./ 0.325 0.496 0.533
^{133}Pr		132.9162	6.5 m	β^+ ,EC/4.3		5/2+			ann.rad./ 0.074 0.1343 0.2419 0.3156 0.3308 0.4650
^{134m}Pr			≈ 11. m	β^+ ,EC/					ann.rad./

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{134}Pr		133.9157	17. m	β^+ ,EC/6.2		2+			0.294 0.460 0.495 0.632 ann.rad./
^{135}Pr		134.9131	24. m	β^+ ,EC/3.7	2.5/	3/2+			0.294 0.495 ann.rad./
^{136}Pr		135.91265	13.1 m	β^+ /57 /5.13 EC/43	2.98/	2+			0.0826 0.2135 0.2961 0.5832 ann.rad./ Ce k x-ray
^{137}Pr		136.91068	1.28 h	β^+ /26 /2.70 EC/74 /	1.68/	5/2+			0.5398 0.5522 ann.rad./ Ce k x-ray
^{138m}Pr			2.1 h	β^+ /24 / EC/76 /	1.65/	7-			0.4339 0.5140 0.8367 (0.16-1.8) ann.rad./ Ce k x-ray
^{138}Pr		137.91075	1.45 m	β^+ /75 /4.44 EC/25 /	3.42/	1+			0.3027 0.7887 1.0378 (0.07-2.0) ann.rad./ Ce k x-ray
^{139}Pr		138.90893	4.41 h	β^+ /8 /2.129 EC/92 /	1.09/	5/2+			0.7887 ann.rad./ Ce k x-ray
^{140}Pr		139.90907	3.39 m	β^+ /51 /3.39 EC/49 /	2.37/	1+			0.2551 1.3473 1.6307 ann.rad./ Ce k x-ray
^{141}Pr	100.	140.907648				5/2+	+4.275	-0.059	0.3069 1.5965
^{142m}Pr			14.6 m	I.T./0.004	c.e./	5-	2.2		
^{142}Pr		141.910041	19.12 h	β- /2.162 EC/0.744	0.58/4 2.16/96	2-	+0.234	+0.030	0.5088 1.57580
^{143}Pr		142.910813	13.57 d	β- /0.934	0.933/	7/2+	+2.7	+0.8	0.7420
^{144m}Pr			7.2 m	I.T./99+ /0.059 β- /		3-			Pr k x-ray 0.0590 0.6965 0.8142
^{144}Pr		143.913301	17.28 m	β- /2.998	0.807/1 2.30/ 2.996/98	0-			0.69649 1.48912 2.18562
^{145}Pr		144.91451	5.98 h	β- /1.81	1.80/97	7/2+			0.0725 0.6758 0.7483

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{146}Pr		145.9176	24.2 m	β- /4.2	2.2/30 3.7/10 4.2/40	2-			0.4539/48 1.5247
^{147}Pr		146.91898	13.4 m	β- /2.69	1.5/ 2.1/	3/2+			0.3146/24. 0.5779/16 0.6413/19.
^{148m}Pr			2.0 m	β- /	4.0/ 3.8/	(4)			0.3016 0.4506 0.6975
^{148}Pr		147.9222	2.27 m	β- /4.9	4.8/ 4.5/	1-			0.3017
^{149}Pr		148.92379	2.3 m	β- /3.40	3.0	(5/2+)			0.1085 0.1385 0.1651
^{150}Pr		149.9270	6.2 s	β- /5.7	≈ 5.5	1-			0.1302 0.8044 0.8527
^{151}Pr		150.9283	22.4 s	β- /4.2					
^{152}Pr		151.9319	3.2 s	β- /6.7		(3)			0.0726 0.164 0.285
^{153}Pr		152.9339	4.3 s	β- /5.5					
^{154}Pr		153.9381	2.3 s	β- /7.9					
$_{60}$Nd		**144.24(3)**							
^{127}Nd		126.941	1.8 s	β^+ ,EC/9.		(5/2)			ann.rad./
^{128}Nd		127.935	4. s	β^+ ,EC/6.					ann.rad./
^{129}Nd		128.933	4.9 s	β^+ ,EC/8.		5/2(-)			ann.rad./ (0.091-0.875)
^{130}Nd		129.929	28. s	β^+ ,EC/5.					ann.rad./
^{131}Nd		130.9271	0.5 m	β^+ ,EC/6.6					ann.rad./ (0.09-0.36)
^{132}Nd		131.9231	1.5 m	β^+ ,EC/3.7					ann.rad./ (0.099-0.567)
^{133}Nd		132.9222	1.2 m	β^+ ,EC/5.6					ann.rad./ (0.06-0.37)
^{134}Nd		133.9187	≈ 8.5 m	β^+ /17 /2.8 EC/83 /		0+			ann.rad./ Pr k x-ray 0.1631/58 (0.09-1.00)
^{135m}Nd			5.5 m	β^+ /					
^{135}Nd		134.9182	12. m	β^+ /65 /4.8 EC/35 /		9/2-	0.78	+2.1	ann.rad./ Pr k x-ray 0.0415/23. 0.204/51. (0.11-1.8)
^{136}Nd		135.9150	50.6 m	EC/94 /2.21 β^+ /6 /	1.04/	0+			Pr kx-ray 0.0401/21. 0.1091/35. (0.10-0.97)
^{137m}Nd			1.6 s	I.T./0.5196		11/2-			Nd k x-ray 0.1084 0.1775 0.2337

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{137}Nd		136.9146	38. m	β^+ /40 /3.69 EC/60 /	1.7/20 2.40/20	1/2+	-0.63		ann.rad./ Pr k x-ray 0.0755 0.5806
^{138}Nd		137.9119	5.1 h	EC/1.1		0+			Pr k x-ray 0.1995 0.3258
^{139m}Nd			5.5 h	I.T./12 /0.231 β^+ /88 /	1.17/	11/2-			Nd k x-ray Pr k x-ray 0.1139/34. 0.7382/30.
^{139}Nd		138.91192	30. m	β^+ /25 /2.79 EC/75 /	1.77/	3/2+	0.91	+0.3	ann.rad./ Pr k x-ray 0.4050
^{140}Nd		139.90931	3.37 d	EC /0.22		0+			Pr k x-ray
^{141m}Nd			1.04 m	I.T./99+ /0.756		11/2-			Nd k x-ray 0.7565
^{141}Nd		140.909605	2.49 h	EC/98 /1.823 β^+ /2 /	0.802/	3/2+	1.01	+0.3	Pr k x-ray (0.15-1.7)
^{142}Nd	27.13(12)	141.907719				0+			
^{143}Nd	12.18(6)	142.909810				7/2-	-1.07	-0.6	
^{144}Nd	23.80(12)	143.910083	2.1×10^{15} y			0+			
^{145}Nd	8.30(6)	144.912569				7/2-	-0.66	-0.33	
^{146}Nd	17.19(9)	145.913113				0+			
^{147}Nd		146.916096	10.98 d	β- /0.896	0.805/	5/2-	0.58	0.9	Pr k x-ray 0.09111 0.53102
^{148}Nd	5.76(3)	147.916889				0+			
^{149}Nd		148.920145	1.73 h	β- /1.691	1.03/25 1.13/26 1.42/	5/2-	0.35	1.3	Pr k x-ray 0.1143/19. 0.2113/27. (0.06-1.6)
^{150}Nd	5.64(3)	149.920887				0+			
^{151}Nd		150.923825	12.4 m	β- /2.442	1.2/	(3/2+)			Pm k x-ray 0.1168 0.2557 1.1806 (0.10-1.9)m
^{152}Nd		151.92468	11.4 m	β- /1.1		0+			0.2785/29. 0.2501/18. (0.016-0.66)
^{153}Nd		152.9280	28.9 s	β- /3.6					0.418
^{154}Nd		153.9296	25.9 s	β- /2.8					0.1519 0.7998
^{155}Nd		154.9334	8.9 s	β- /5.0					0.1807
^{156}Nd		155.9355	5.5 s	β- /4.1					0.0848
$_{61}$Pm									
^{130}Pm		129.940	2.2 s	β^+ ,EC/11.					ann.rad./
^{132}Pm		131.934	6. s	β^+ ,EC/10.					ann.rad./
^{133}Pm		132.930	12. s	β^+ ,EC/≈ 7.0					ann.rad./
^{134}Pm		133.9282	24. s	β^+ ,EC/≈ 8.9		(5+)			ann.rad./ 0.294

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.495
^{135}Pm		134.9247	0.8 m	β^+ ,EC/6.0		11/2-			(0.13-0.47)
^{136}Pm		135.9235	1.8 m	β^+ /89 /7.9		(3+)			ann.rad./
				EC/11 /					Nd k x-ray
									0.3735
									0.6027
^{137}Pm		136.9206	2.4 m	β^+ ,EC/5.6		(11/2-)			ann.rad./
									0.1086
									0.1775
^{138m}Pm			3.2 m	β^+ /50 /≈ 7.0	3.9/	3+			ann.rad./
				EC/50 /					Nd k x-ray
									0.5209
									0.7290
^{138}Pm		137.9193	10. s	β^+ /6.9	6.1/	1+			ann.rad./
^{139m}Pm			0.18 s	IT/		(11/2-)			0.1887
^{139}Pm		138.91678	4.14 m	β^+ /68 /4.52	3.52/	(5/2+)			ann.rad./
				EC/32 /					Nd k x-ray
									0.4028
									(0.27-2.4)
^{140m}Pm			5.87 m	β^+ /70 /	3.2	7/2-			ann.rad./
				EC/30 /					Nd k x-ray
									0.4199
									0.7738
									1.0283
^{140}Pm		139.91585	9.2 s	β^+ /89 /6.09	5.07/74	1+			ann.rad./
				EC/11 /					Nd k x-ray
									0.7738
									1.4898
^{141}Pm		140.91359	20.9 m	β^+ /52 /3.72	2.71	5/2+			ann.rad./
				EC/48 /					Nd k x-ray
									0.8862
									1.2233
^{142}Pm		141.91295	40.5 s	β^+ /86 /4.87	3.8/	1+			ann.rad./
				EC/20 /					Nd k x-ray
									0.6414
									1.5758
^{143}Pm		142.910928	265. d	EC/1.041		5/2+	3.8		Nd k x-ray
				β^+ /<6 x 10^{-6}/					0.7420
^{144}Pm		143.912586	360. d	EC/2.332		5-	1.7		Nd k x-ray
				β^+ /<8 x 10^{-5}/					0.6180
									0.6965
^{145}Pm		144.912745	17.7 y	EC/0.163		5/2+			Nd k x-ray
									0.0723
^{146}Pm		145.914693	5.53 y	EC/63 /1.472		3-			Nd k x-ray
				β- /37 /1.542	0.795/				0.4538
									0.7362
									0.7474
^{147}Pm		146.915134	2.6234 y	β- /0.224	0.224/	7/2+	+2.6	+0.7	0.1213
									0.1974
^{148m}Pm			41.3 d	β- /95 /2.6	0.4/60	6-	1.8		0.5503/94.
				I.T./5 /0.137	0.5/17				0.6300/89.
					0.7/21				0.7257/33
^{148}Pm		147.91747	5.37 d	β- /2.47	1.02/	1-	+2.0	+0.2	0.5503
					2.47/				0.9149
									1.4651

TABLE OF THE ISOTOPES

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^{149}Pm		148.918330	2.212 d	β- /1.071	0.78/9 1.072/90	7/2+	3.3		0.2859 0.5909 0.8594
^{150}Pm		149.92098	2.68 h	β- /3.45	1.6/ 2.3/ 1.8/	(1-)			0.3339/69. 1.1658/16. 1.3245/17. (0.25-2.9)
^{151}Pm		150.92120	1.183 d	β- /1.187	0.84/	5/2+	+1.8	1.9	0.1677/8 0.2751/7 0.3401/22
^{152m2}Pm			15. m	β- ,I.T./		(>6)			(0.14-1.4)
^{152m1}Pm			7.5 m	β- /		(4-)			0.1218 0.2447 0.3404 1.0971 1.4375
^{152}Pm		151.9235	4.1 m	β- /3.5	3.5/20 3.50/60	1+			0.1218 (0.12-2.1)
^{153}Pm		152.92414	5.4 m	β- /1.90	1.7/	(5/2-)			0.0910 0.1198 0.1273
^{154m}Pm			2.7 m	β- /	2.0/				0.0820 0.1848 1.4403
^{154}Pm		153.9266	1.7 m	β- /4.1	1.9/				0.0820 0.8396 1.3940 2.0589 (0.08-2.8)
^{155}Pm		154.9280	48. s	β- /3.2		(5/2-)			(0.05-0.78)
^{156}Pm		155.93106	26.7 s	β- /5.16					
^{157}Pm		156.9332	10.9 s	β- /4.6					
^{158}Pm		157.9367	5. s	β- /6.3					
$_{62}$Sm		**150.36(3)**							
^{131}Sm		130.946	1.2 s	β^+ ,EC/					ann.rad./
^{132}Sm		131.941	4.0 s	β^+					
^{133}Sm		132.939	2.9 s	β^+ ,EC/≈8.4		5/2+			ann.rad./
^{134}Sm		133.934	11. s	β^+ ,EC/5.		0+			ann.rad./
^{135}Sm		134.932	10. s	β^+ ,EC/7.		7/2+			ann.rad./
^{136}Sm		135.9283	42. s	β^+ ,EC/4.5		0+			ann.rad./
^{137}Sm		136.9271	45. s	β^+ ,EC/6.1					ann.rad./
^{138}Sm		137.9235	3.0 m	β^+ ,EC/3.9		0+			ann.rad./ 0.0536 0.0747
^{139m}Sm			10. s	I.T./94 /0.457 β^+ /6 /	 4.7	(11/2-)			Sm k x-ray 0.1118 0.1553 0.1901 0.2673
^{139}Sm		138.9226	2.6 m	β^+ /75 /5.5 EC/25 /	4.1/	1/2+	-0.53		Pm k x-ray 0.3678 0.4028 (0.27-2.4)

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{140}Sm		139.9195	14.8 m	β^+ ,EC/3.4	1.9/	0+			ann.rad./ Pm k x-ray 0.1396 0.2255 (0.07-1.7)
^{141m}Sm			22.6 m	β^+ /32 / EC/68 / I.T./0.3 /0.1758	1.6/ 2.19/	11/2-	-0.83	+1.6	ann.rad./ Pm k x-ray 0.1966 0.4318 0.7774
^{141}Sm		140.91847	10.2 m	β^+ /52 /4.54 EC/48 /	3.2/	1/2+	-0.74		ann.rad./ Pm k x-ray 0.4382
^{142}Sm		141.91520	1.208 h	β^+ /6 /2.10 EC/94 /	1.0/	0+			ann.rad./ Pm k x-ray
^{143m}Sm			1.10 m	I.T./99 /0.7540		11/2-			Sm k x-ray 0.7540
^{143}Sm		142.914624	8.83 m	β^+ /46 /3.443 EC/54 /	2.47/	3/2+	+1.01	+0.4	ann.rad./ Pm k x-ray 1.0565
^{144}Sm	3.1(1)	143.911996				0+			
^{145}Sm		144.913407	340. d	EC/0.617		7/2-	-1.1	-0.6	Pm k x-ray 0.0613 0.4924
^{146}Sm		145.913038	1.03×10^{8}y	α/	2.50/	0+			
^{147}Sm	15.0(2)	146.914894	1.06×10^{11}y	α/	2.23/	7/2-	-0.815	-0.26	
^{148}Sm	11.3(1)	147.914818	7×10^{15}y	α/	1.96/	0+			
^{149}Sm	13.8(1)	148.917180	10^{16}y	α/		7/2-	-0.672	+0.075	
^{150}Sm	7.4(1)	149.917272				0+			
^{151}Sm		150.919929	90. y	β- /0.0768	0.076/	5/2-	-0.363	+0.7	0.02154
^{152}Sm	26.7(2)	151.919729				0+			
^{153}Sm		152.922094	1.929 d	β- /0.808	0.64/ 0.69/	3/2+	-0.0216	+1.3	Eu k x-ray 0.069676 0.10318
^{154}Sm	22.7(2)	153.922206				0+			
^{155}Sm		154.924636	22.2 m	β- /1.627	1.52	3/2-		1.1	Eu k x-ray 0.1043/75.
^{156}Sm		155.92553	9.4 h	β- /0.72	0.43/ 0.71/	0+			0.0872 0.1657 0.2038
^{157}Sm		156.9283	8.0 m	β- /2.7	2.4/	3/2-			Eu k x-ray 0.1964 0.1978 0.3942
^{158}Sm		157.9299	5.5 m	β- /2.0		0+			0.1894/100. 0.3636/82.
^{159}Sm		158.9332	11.3 s	β- /3.8					0.1898
^{160}Sm		159.9353	9.6 s	β- /3.6		0+			0.110
$_{63}$Eu		**151.964(1)**							
^{134}Eu		133.946	0.5 s	EC,β^+					ann.rad./
^{135}Eu		134.942	1.5 s	EC,β^+ /≈8.7					ann.rad./
^{136m}Eu			≈ 3.2 s			7+			0.255
^{136}Eu		135.940	≈ 3.9 s	EC,β^+ /10.		1+			ann.rad./

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{137}Eu		136.935	11. s	EC/≈7.5		11/2-			ann.rad./
^{138}Eu		137.9335	12. s	EC,β^+ /≈ 9.2		7+			ann.rad./
^{139}Eu		138.9298	18. s	EC,β^+ /6.7					ann.rad./
^{140m}Eu			0.125 s	EC,β^+					ann.rad./
^{140}Eu		139.9285	1.51 s	EC,β^+ /8.4		1-			ann.rad./
^{141m}Eu			3.0 s	β^+ /58 / EC/9 / I.T./33 /0.0964		11/2-			ann.rad./ Eu k x-ray (0.09-1.6)
^{141}Eu		140.9244	40. s	β^+/81 /5.6 EC/15 /		5/2+	+3.49	+0.85	ann.rad./ Sm k x-ray 0.3845 0.3940
^{142m}Eu			1.22 m	β^+/83 / EC/17 /	4.8/	8-	+2.98	+1.4	ann.rad./ Sm k x-ray 0.5566 0.7680 1.0233
^{142}Eu		141.9231	2.4 s	β- /94/7.4 EC/6 /	7.0/	1+	+1.54	+0.12	ann.rad./ 0.7680
^{143}Eu		142.92017	2.62 m	β^+ /72/5.17 EC/28/	4.1/ 5.1/	5/2+	+3.67	+0.51	ann.rad./ Sm k x-ray 0.1107/7 1.5368/3. 1.9127/2.
^{144}Eu		143.91879	10.2 s	β^+ /86 /6.33 EC/13 /	5.31/	1+	+1.89	+0.10	ann.rad./ Sm k x-ray 1.6601
^{145}Eu		144.916263	5.93 d	β^+ /2 /2.660 EC/98 /1.71	0.79/	5/2+	+3.99	+0.29	ann.rad./ Sm k x-ray 0.6535 0.8937 1.6587
^{146}Eu		145.91720	4.57 d	β^+ /5 /3.88 EC/95 /	1.47/	4-	+1.43	-0.18	ann.rad./ Sm k x-ray 0.6336 0.6341 0.7470 (0.27-2.64)
^{147}Eu		146.916742	24.4 d	EC/99. /1.722 β^+ /0.4 /		5/2+	+3.72	+0.55	Sm k x-ray 0.12113 0.19725 0.6776
^{148}Eu		147.91815	54.5 d	EC/3.11	0.92	5-	+2.34	+0.35	Sm k x-ray 0.5503/99. 0.6299/71. (0.067-2.17)
^{149}Eu		148.91792	93.1 d	EC/0.692		5/2+	+3.57	+0.75	Sm k x-ray 0.2770 0.3275
^{150}Eu		149.91970	36. y	EC/2.26		5-	+2.71	+1.13	Sm k x-ray 0.3340 0.4394 0.5843 (0.25-1.8)
^{150m}Eu			12.8 h	β- /92 /	1.013/	0-			Sm k x-ray

TABLE OF THE ISOTOPES

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				β^+ /0.4 /	1.24/				0.3339
				EC/8 /					0.4065
^{151}Eu	47.8(1.5)	150.919846				5/2+	+3.472	+0.90	
^{152m2}Eu			1.60 h	I.T./0.1478		8-			Eu k x-ray
									0.0898
^{152m1}Eu			9.30 h	β- /72 /	1.85/	0-			Sm k x-ray
				EC/28 /	0.89/				0.12178
									0.84153
									0.96334
^{152}Eu		151.921741	13.5 y	EC/72 /1.874	0.69/	3-	-1.941	+2.71	Sm k x-ray
				β- /28 /1.818	1.47/				Gd k x-ray
									0.12178
									0.34427
									1.40802
									(0.252-1.528)
^{153}Eu	52.2(15)	152.921227				5/2+	+1.533	+2.41	
^{154m}Eu			46.1 m	I.T./≈ 0.16		8-			Eu k x-ray
									0.0682
									0.1009
^{154}Eu		153.922976	8.59 y	β- /99.9 /1.969	0.27/29	3-	-2.01	+2.8	Gd k x-ray
				EC./0.02 /0.717		0.58/38			0.12299/40.
					0.84/17				0.72331/20.
					0.98/4				1.2745/36
					1.87/11				(0.059-1.90)
^{155}Eu		154.922890	4.76 y	β- /0.252	0.15/	5/2+	+1.6	+2.3	Gd k x-ray
									0.0865/30
									0.1053/20
^{156}Eu		155.92475	15.2 d	β- /2.451	0.30/11	1+	≈ 1.1		0.08899/9.
					0.49/30				0.64623/7.
					1.2/12				0.723441/6.
					2.45/31				0.8118/10.
^{157}Eu		156.92542	15.13 h	β- /1.36	0.98/	(5/2+)			Gd k x-ray
					1.30/41				0.0639/100.
									0.3705/48.
									0.4107/76.
^{158}Eu		157.9278	45.9 m	β- /3.5	2.5/	(1-)			0.0795
									0.8976
									0.9442
									0.9771
^{159}Eu		158.92909	18.1 m	β- /2.51	2.4/	(5/2+)			0.0678
					2.57/				0.0786
									0.0957
^{160}Eu		159.9315	38. s	β- /4.1	2.7/	(0-)			0.0753
					4.1/				0.1735
									0.4131
									0.5155
									0.8217
									0.9110
									0.9246
^{161}Eu		160.9337	27. s	β- /3.7					0.0719
^{162}Eu		161.9370	11. s	β- /5.6					
$_{64}$Gd		**157.25(3)**							
^{135}Gd			1.1 s	β^+					(0.163-0.360)

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{137}Gd		136.945	7. s	EC,β^+ /≈8.8					ann.rad./
^{139}Gd		138.9381	5. s	EC,β^+ /≈7.7					ann.rad./
^{140}Gd		139.934	16. s	EC/4.8		0+			0.1748
^{141m}Gd			25. s	EC,β^+ /		11/2-			ann.rad./
^{141}Gd		140.9322	21. s	β^+ /7.3		0+			ann.rad./
^{142}Gd		141.9276	1.17 m	EC,β^+ /4.2		1/2+			ann.rad./
^{143m}Gd			1.84 m	β^+ /67 / EC/33 / I.T./		11/2-			ann.rad./ Eu k x-ray 0.1176 0.2719 0.5880 0.6681 0.7999
^{143}Gd		142.9266	39. s	β^+ /82 /6.0 EC/18 /		1/2+			ann.rad./ Eu k x-ray 0.2048 0.2588
^{144}Gd		143.9234	4.5 m	β^+ /45 /4.3 EC/55 /	3.3/	0+			ann.rad./ Eu k x-ray 0.3332
^{145m}Gd			1.44 m	I.T./95 /0.749 β^+ /4 /5.7		11/2-			0.0273 0.3295 0.3866 0.7214
^{145}Gd		144.92169	23.4 m	β^+ /33 /5.05 EC/67 /	2.5/	1/2+			ann.rad./ Eu k x-ray 1.7579 1.8806 (0.32-3.69)
^{146}Gd		145.91831	48.3 d	EC/99.9 /1.03 β^+ /0.2	0.35/	0+			Eu k x-ray 0.1147 0.1155 0.1546
^{147}Gd		146.919090	1.588 d	EC/99.8 /2.188 EC/0.2 /	0.93/	7/2-	1.0		Eu k x-ray 0.2293 0.3699 0.3960 0.9289 (0.1-1.8)
^{148}Gd		147.918111	75. y	α/3.27	3.1828/		0+		
^{149}Gd		148.919339	9.3 d	EC/1.32		7/2-	0.9		Eu k x-ray 0.1496 0.2985 0.3465
^{150}Gd		149.91866	1.8×10^6 y	α/2.80	2.73/	0+			
^{151}Gd		150.920345	124. d	EC/0.464		7/2-	0.8		Eu k x-ray 0.1536 0.2432
^{152}Gd	0.20(1)	151.919789				0+			
^{153}Gd		152.921747	241.6 d	EC/0.485		3/2-	0.4		Eu k x-ray 0.09743 0.10318
^{154}Gd	2.18(3)	153.920862				0+			
^{155}Gd	14.80(5)	154.922619				3/2-	-2.59	+1.30	
^{156}Gd	20.47(4)	155.922120				0+			

TABLE OF THE ISOTOPES

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^{157}Gd	15.65(3)	156.923957				3/2-	-3.40	+1.36	
^{158}Gd	24.84(12)	157.924101				0+			
^{159}Gd		158.926385	18.6 h	β- 0.971	0.60/11 0.89/26 0.96/63	3/2-	-0.44		Tb k x-ray 0.36351 (0.05845-0.8550)
^{160}Gd	21.86(4)	159.927051				0+			
^{161}Gd		160.929666	3.66 m	β- /1.956	1.56/85	5/2-			Tb k x-ray 0.1023 0.3149 0.3609
^{162}Gd		161.930981	8.4 m	β- /1.39	1.0/	0+			0.4030 0.4421
^{163}Gd		162.9340	1.13 m	β- /3.1					0.2868 0.214 1.685
^{164}Gd		163.9359	45. s	β- /2.3					
$_{65}$Tb		**158.92534(2)**							
^{140}Tb		139.946	2.4 s	β^+ ,EC/11					
^{141}Tb		140.941	3.5 s	β^+ ,EC/≈ 8.3					
^{142m}Tb			0.30 s	β^+ ,EC/		4-			
^{142}Tb		141.939	0.60 s	β^+ ,EC/10.		0+			
^{143}Tb		142.9346	12. s	β^+ ,EC/7.4		11/2-			
^{144m}Tb			4.1 s	IT		5-			
^{144}Tb		143.9324	< 1.5 s	β^+ ,EC/8.4		1+			
^{145m}Tb			30. s	β^+ ,EC/≈ 6.6		11/2-			ann.rad./ 0.2577 0.5370 0.9876
^{145}Tb		144.9287		β^+ ,EC/6.5		1/2+			
^{146m}Tb			23. s	β^+ /76 / EC/24 /		(5-)			ann.rad./ Gd k x-ray 1.0789 1.5795
^{146}Tb		145.9270	≈ 8. s	β^+ /8.1		1+			
^{147m}Tb			1.8 m	β^+ /35 / EC/65 /		11/2-			ann.rad./ Gd k x-ray 1.3977 1.7978
^{147}Tb		146.92404	1.6 h	β^+ /42 /4.61 EC/58 /		5/2+			ann.rad./ Gd k x-ray 0.6944 1.1522 (0.120-3.318)
^{148m}Tb			2.3 m	β^+ /25 / EC/75 /		9+			ann.rad./ Gd k x-ray 0.3945 0.6319 0.7845 0.8824
^{148}Tb		147.92422	1.00 h	β^+ ,EC/5.69		2-			ann.rad./ Gd k x-ray 0.4888 0.7845

TABLE OF THE ISOTOPES

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^{149m}Tb			4.16 m	EC/88 / β^+ /12 /		11/2-			(0.14-3.8) ann.rad./ Gd k x-ray 0.1650 0.7960
^{149}Tb		148.923243	4.13 h	β^+ /4 /3.636 α/16/	1.8/ 3.97/	1/2+	<0.9		Gd k x-ray 0.1650 0.3522 0.3886
^{150m}Tb			6.0 m	β^+ /17 / EC/83 /					(0.1-3.2) ann.rad./ Gd k x-ray 0.4384 0.6380 0.6504 0.8275
^{150}Tb		149.92366	3.3 h	β^+ ,EC/4.66		2-			ann.rad./ 0.4963 0.6380
^{151m}Tb			25. s	I.T./95 / β^+ ,EC/7 /		11/2-			(0.3-4.29) 0.0229 0.0495 0.3797 0.8305
^{151}Tb		150.923099	17.61 h	β^+ /1 /2.565 EC/99 /	0.70/	1/2+			Gd k x-ray 0.1083 0.2517 0.2870
^{152m}Tb			4.3 m	I.T./79 /0.5018 EC/21 /4.35		(8+)			(0.1-1.8) Tb k x-ray Gd k x-ray 0.2833 0.3443 0.4111
^{152}Tb		151.92407	17.5 h	β^+ /20 /3.99 EC/80 /	2.5/ 2.8/	2-	0.9		ann.rad./ Gd k x-ray 0.3443
^{153}Tb		152.923433	2.34 d	EC/1.570		5/2+	3.5		(0.2-2.88) Gd k x-ray 0.2119
^{154m2}Tb			23.1 h	EC/98 / I.T./2 /		(7-)			(0.05-1.1) Gd k x-ray 0.1231 0.2479 0.3467 1.4199
^{154m1}Tb			9. h	β^+ /78 / I.T./22 /		(3-)	1.8	+3.	Gd k x-ray 0.1231 0.2479 0.5401
^{154}Tb		153.92469	21.5 h	EC/99 /3.56 β^+ /1 /	1.86/ 2.45	0-	0.9		(0.12-2.57) Gd k x-ray 0.1231 1.2744 2.1872 (0.12-3.14)

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{155}Tb		154.92350	5.3 d	EC/0.82		3/2+	2.0		Gd k x-ray 0.08654 0.10530
^{156m2}Tb			1.02 d	I.T./		(7-)			Tb k x-ray 0.0496
^{156m1}Tb			5.3 h	I.T./0.0884		(0+)			Tb k x-ray 0.0884
^{156}Tb		155.924744	5.3 d	EC/2.444		3-	1.4	+2.3	Gd k x-ray 0.08896 0.19921 0.53435 1.22245
^{157}Tb		156.924021	1.1x10^{2} y	EC/0.0601		3/2+	2.0		Gd k x-ray 0.0545
^{158m}Tb			10.5 s	I.T./0.11		0-			Gd k x-ray 0.0110
^{158}Tb		157.925410	1.8x10^{2} y	EC/80 /1.220 β- /20 /0.937		3-	+1.76	+2.7	Gd k x-ray 0.0795 0.9442 0.9621
^{159}Tb	100.	158.925343				3/2+	+2.014	+1.43	
^{160}Tb		159.927164	72.3 d	β- /1.835	0.57/47 0.86/27	3-	+1.79	3.8	Dy k x-ray 0.08678 0.29857 0.87936 0.96615
^{161}Tb		160.927566	6.91 d	β- /0.593	0.46/23 0.52/66 0.6/10	3/2+	2.2	+1.2	Dy k x-ray 0.02565 0.04892 0.07458
^{162}Tb		161.92948	7.6 m	β- /2.51	1.4	(1/2-)			Dy k x-ray 0.2600 0.8075 0.8882
^{163}Tb		162.930644	19.5 m	β- /1.785	0.80/	3/2+			Dy k x-ray 0.3511 0.3897 0.4945
^{164}Tb		163.9334	3.0 m	β- /3.9	1.7/	(5+)			Dy k x-ray 0.1689 0.2157 0.6110 0.6885 0.7548
^{165}Tb		164.9349	2.1 m	β- /3.0		3/2+			0.5389 1.1785 1.2920 1.6648
^{166}Tb		165.9380	≈ 21 s	β^{-}/					
$_{66}$Dy		**162.50(3)**							
^{141}Dy		140.951	0.9 s	EC,β^{+} /9.					
^{142}Dy		141.946	2.3 s	EC,β^{+} /7.1					
^{143}Dy		142.9440	3.9 s	EC,β^{+} /≈ 8.8					

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^{144}Dy		143.9391	9.1 s	EC,β^+ /≈ 6.2					
^{145m}Dy		144.9365	14. s	EC,β^+		11/2-			
^{146m}Dy			0.15 s	I.T.		10+			
^{146}Dy		145.9325	30. s	EC,β^+ /5.2					
^{147m}Dy			56. s	I.T./40 / β^+ ,EC/60 /		(11/2-)	-0.66	+0.7	Dy k x-ray 0.072 0.6787
^{147}Dy		146.9309	75. s	EC,β^+ /6.37		1/2+	-0.92	0.1007	ann.rad./ 0.2534 0.3653
^{148}Dy		147.92710	3.1 m	β^+ /4 /2.68 EC/96 /	1.2/	0+			ann.rad./ Tb k x-ray 0.6202
^{149}Dy		148.92734	4.2 m	β^+ ,EC/3.81		(7/2-)	-0.12	-0.62	ann.rad./ 0.1008 0.1063 0.2534 0.6536 0.7894 1.7765 1.8062
^{150}Dy		149.92558	7.18 m	β^+ ,EC/67 /1.79 α /33 /	4.233/	0+			Tb k x-ray 0.3967
^{151}Dy		150.926181	17. m	β^+ /5 /2.871 EC/89 / α /6 /	4.067/	7/2-	-0.95	-0.30	Tb k x-ray 0.1764 0.3030 0.3861 0.5463 (0.16-2.09)
^{152}Dy		151.92472	2.37 h	EC/0.60 α /	3.63/	0+			Tb k x-ray 0.2569
^{153}Dy		152.925763	6.3 h	β^+ /1 /2.171 EC/99 / α /0.01 /	0.89/ 3.46/	(7/2-)	-0.78	-0.02	Tb k x-ray 0.0807 0.0997 0.2137 (0.08-1.66)
^{154}Dy		153.92442	$3.x10^6$ y	α/2.95	2.87/	0+			
^{155}Dy		154.92575	9.9 h	β^+ /2 /2.095 EC/98 /	0.845/	3/2-	-0.385	+1.04	Tb k x-ray 0.0655 0.2269
^{156}Dy	0.06(1)	155.92428				0+			
^{157}Dy		156.92546	8.1 h	EC/1.34		3/2-	-0.301	+1.30	Tb k x-ray (0.0609-1.319)
^{158}Dy	0.10(1)	157.924405				0+			
^{159}Dy		158.925736	144. d	EC/0.366		3/2-	-0.354	+1.37	Tb k x-ray 0.3262
^{160}Dy	2.34(6)	159.925194				0+			
^{161}Dy	18.9(2)	160.926930				5/2+	-0.480	+2.51	
^{162}Dy	25.5(2)	161.926795				0+			
^{163}Dy	24.9(2)	162.928728				5/2-	+0.673	+2.65	
^{164}Dy	28.2(2)	163.929171				0+			
^{165m}Dy			1.26 m	I.T./98 /0.108 β- /2 /		1/2-			Dy k x-ray 0.1082 0.5155

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{165}Dy		164.931700	2.33 h	β- /1.286	1.29/	7/2+	-0.52	-3.5	Ho k x-ray 0.09468
^{166}Dy		165.932803	3.400 d	β- /0.486	0.40/	0+			Ho k x-ray 0.0282 0.0825
^{167}Dy		166.9357	6.2 m	β- /≈ 2.35	1.78	(1/2-)			Ho k x-ray 0.2593 0.3103 0.5697 (0.06-1.4)
^{168}Dy		167.9372	8.5 m	β- /1.6		0+			Ho k x-ray 0.1925 0.4867
^{169}Dy		168.9403	≈ 39. s	β- /3.2					
$_{67}$Ho		**164.93032(2)**							
^{144}Ho		143.952	0.7 s	β^+ ,EC/12					
^{145}Ho		144.947	2.4 s	β^+					
^{146}Ho		145.9440	3.3 s	β^+ ,EC/10.7		(10+)			ann.rad./
^{147}Ho		146.9396	5.8 s	β^+ ,EC/8.2		11/2-			ann.rad./
^{148m}Ho			9. s	β^+ ,EC/		4-			ann.rad./
^{148}Ho		147.9372	2. s	β^+ ,EC/9.4		1+			ann.rad./ 0.6615 1.6883
^{149m}Ho			21. s	β^+ ,EC/		11/2-			ann.rad./ 1.0733 1.0911
^{149}Ho		148.93379	> 30. s	β^+ ,EC/6.01		1/2+			
^{150m}Ho			25. s	β^+ ,EC/		(9+)			ann.rad./ 0.3939 0.5511 0.6534 0.8034
^{150}Ho		149.9326	1.3 m	β^+ ,EC/6.6					ann.rad./ 0.5913 0.6534 0.8034
^{151m}Ho			47. s	β^+ ,EC/87 / α/13	4.605/				ann.rad./ 0.2102 0.4889 0.6948 0.7762
^{151}Ho		150.93169	35.2 s	β^+ ,EC/80/5.13 α/20 /	4.519/				ann.rad./ 0.3522 0.5274 0.9676 1.0471
^{152m}Ho			50. s	β^+ ,EC/90 / α/10 /	4.453/	(9+)	+5.9	-1.	ann.rad./ 0.4929 0.6138 0.6474 0.6835
^{152}Ho		151.93166	2.4 m	β^+ ,EC/88 /6.47 α/12 /	4.387/	(3+)	-1.02	+0.1	ann.rad./ 0.6140

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{153m}Ho			9.3 m	β^+ ,EC/99+ /4.12 α/	4.01/		5/2	+1.19	0.6476 ann.rad./ 0.0905 0.1089 0.1618 0.2302 0.2707 0.3659 0.4565
^{153}Ho		152.93020	2.0 m	β^+ ,EC/99+ /4.13 α/	3.91/	11/2-	+6.8	-1.	ann.rad./ 0.2958 0.3346 0.4381 0.6383
^{154m}Ho			3.3 m	β^+ ,EC/		(8+)	5.7	-.1.	ann.rad./ 0.3346 0.4124 0.4771
^{154}Ho		153.93060	12. m	β^+ ,EC/5.75		1-	-0.64	+0.2	ann.rad./ Dy k x-ray 0.3346 0.5700 0.8734
^{155}Ho		154.92908	48. m	β^+ /6 /3.10 EC/94 /		(5/2+)	+3.51	+1.5	ann.rad./ Dy k x-ray 0.0474 0.1363 0.3254
^{156m}Ho			5.8 m	I.T./0.0352 β^+ /25 / EC/75 /	1.8/ 2.9/		+2.99	+2.3	(0.06-2.24) ann.rad./ Dy k x-ray 0.1378 0.2666
^{156}Ho		155.9290	56. m	β^+ ,EC/4.4		(5+)			(0.28-2.9) ann.rad./ 0.1378 0.2665
^{157}Ho		156.92819	12.6 m	β^+ /5 /2.54 EC/95 /	1.18/	7/2-	+4.35	+3.0	ann.rad./ Dy k x-ray 0.2800 0.3411
^{158m2}Ho			28. m	I.T./44 / EC/56 /		2-	+2.44	+1.6	ann.rad./ Dy k x-ray 0.0989 0.2182
^{158m1}Ho			21. m	β^+ ,EC/		(9+)			ann.rad./ 0.0981 0.1664 0.2182 0.3205 0.4062 0.9774 1.0532
^{158}Ho		157.92895	11.3 m	β^+ /8 /4.24	1.30/	5+	+3.77	+4.1	0.4846 ann.rad./

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
				EC/92 /					Dy k x-ray 0.0989 0.2182 0.9488
^{159m}Ho			8.3 s	I.T./0.206		1/2+			Ho k x-ray 0.1660 0.2059
^{159}Ho		158.927708	33.0 m	EC/1.838		7/2-	+4.28	+3.2	Dy k x-ray 0.1210 0.1320 0.2529 0.3096 (0.06-1.2)
^{160m2}Ho			3. s			1+			
^{160m}Ho			5.0 h	I.T./67 /0.060 EC/33 /3.35		2-	+2.52	+1.8	0.0868 0.1970 0.6464 0.7281 0.8791 0.9619 0.9658
^{160}Ho		159.92873	25.6 m	β^+ ,EC/3.29	0.57/	5+	+3.71	+4.0	See Ho[166m] 0.7282 0.8794
^{161m}Ho			6.8 s	I.T./0.211					Ho k x-ray 0.2112
^{161}Ho		160.927852	2.48 h	EC/0.859		7/2-	+4.25	+3.2	Dy k x-ray 0.0256 0.0592 0.0774 0.1031
^{162m}Ho			1.12 h	I.T./61 / EC/39 /		6-	+3.60	+4.	Dy k x-ray Ho k x-ray 0.0807 0.1850 0.2828 0.9372 1.2200
^{162}Ho		161.929092	15. m	EC/96 /0.295 β^+ /4 /		1+			Dy k x-ray 0.0807 1.3196 1.3728
^{163m}Ho			1.09 s	I.T./0.298		(1/2+)			Ho k x-ray 0.2798
^{163}Ho		162.928730	4.57×10^3 y	EC/0.00258		7/2-	+4.23	+3.6	Dy M x-rays
^{164m}Ho			38. m	I.T./0.140		(6-)			Ho k x-ray 0.0373 0.0566 0.0940
^{164}Ho		163.930231	29. m	EC/58 /0.987 β- /42 /0.963		1+			Dy k x-ray 0.0734 0.0914
^{165}Ho	100.	164.930319				7/2-	+4.127	+3.49	
^{166m}Ho			1.2×10^3 y	β- /		7-	3.6	-3.	Er k x-ray 0.18407 0.71169

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.81031
^{166}Ho		165.932281	1.117 d	β- /1.855	1.776/48	0-			Er k x-ray
					1.855/51				0.08057
									1.37943
^{167}Ho		166.933127	3.1 h	β- /1.007	0.31/43	(7/2-)			Er k x-ray
					0.61/21				0.0793
					0.96/15				0.0835
					0.97/15				0.2379
									0.3213
									0.3465
^{168m}Ho			2.2 m	I.T./					
^{168}Ho		167.93550	3.0 m	β- /2.91	2.0/	3+			Er k x-ray
									0.7413
									0.8159
									0.8211
									(0.08-2.34)
^{169}Ho		168.93687	4.7 m	β- /2.12	1.2/	(7/2-)			
					2.0/				0.1496
									0.7610
									0.7784
									0.7884
									0.8529
^{170m}Ho			43. s	β- /		1+			0.0787
									0.8123
									1.8940
									1.9726
^{170}Ho		169.93962	2.8 m	β- /3.87		6+			Er k x-ray
									0.1816
									0.2582
									0.8902
									0.9321
									0.9414
									1.1387
^{171}Ho		170.941	53 s	β^-/					
^{172}Ho		171.9448	25. s	β- /					Er k x-ray
									(0.077-1.186)
$_{68}$Er		**167.26(3)**							
^{145}Er		144.957	0.9 s	β^+					
^{146}Er		145.952	≈ 1.7 s	β^+					
^{147}Er		146.9494	2.5 s	E.C,β^+ /≈ 9.1					
^{148}Er		147.9444	4.5 s	β^+ ,EC/6.8					
^{149m}Er			10. s	IT		11/2-			
^{149}Er		148.9425	10.7 s	ECβ^+ /8.1		1/2+			
^{150}Er		149.9370	18. s	β^+ /36 /4.11		0+			ann.rad./
				EC/64 /					Ho k x-ray
									0.4758
^{151}Er		150.9373	23. s	β^+ ,EC/5.2		7/2-			ann.rad./
^{152}Er		151.93500	10.2 s	β^+ ,EC/10 /3.11		0+			ann.rad./
				α/90 /	4.804/				
^{153}Er		152.93509	37.1 s	α/	4.674				0.351
				β^+ ,EC/47 /4.56	4.35/				(0.0945-1.700)
^{154}Er		153.93278	3.7 m	β^+ ,EC/99+ /2.03			0+		ann.rad./
				α/0.5 /	4.166/				

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^{155}Er		154.93321	5.3 m	β^+ ,EC/47 /3.84 EC/53 /		(7/2-)	-0.669	-0.27	ann.rad./ Ho k x-ray 0.1101 0.2415
^{156}Er		155.9308	20. m	β^+ ,EC/1.7		0+			ann.rad./ 0.0298 0.0352 0.0522 0.1336
^{157}Er		156.9319	25. m	β^+ ,EC/3.5		3/2-	-0.412	+0.92	ann.rad./ 0.117 0.385 1.320 1.660 1.820 2.000
^{158}Er		157.93087	2.2 h	EC/99.5 /1.78 β^+ /0.5 /	0.74/	0+			Ho k x-ray 0.0719 0.2486 0.3868
^{159}Er		158.930681	36. m	β^+ /7 /2.769 EC/93 /		3/2-	-0.304	+1.17	ann.rad./ Ho k x-ray 0.6245 0.6493 (0.07-2.5)
^{160}Er		159.92908	1.191 d	EC/0.33		0+			Ho k x-ray (0.05-0.96)
^{161}Er		160.93000	3.21 h	EC/2.00		3/2-	-0.37	+1.36	Ho k x-ray 0.8265 (0.07-1.74)
^{162}Er	0.14(1)	161.928775				0+			
^{163}Er		162.93003	1.25 h	EC/1.210		5/2-	+0.557	+2.55	Ho k x-ray 0.4361 0.4399 1.1135
^{164}Er	1.61(2)	163.929197				0+			
^{165}Er		164.930723	10.36 h	EC/0.376		5/2-	+0.643	+2.71	Ho k x-ray
^{166}Er	33.6(2)	165.930290				0+			
^{167m}Er			2.27 s	I.T./0.208		1/2-			Er k x-ray 0.2078
^{167}Er	22.95(15)	166.932046				7/2+	-0.5639	+3.57	
^{168}Er	26.8(2)	167.932368				0+			
^{169}Er		168.934588	9.40 d	β- /0.351	0.35/≈ 100	1/2-	+0.515		Tm k x-ray 0.1098 0.1182
^{170}Er	14.9(2)	169.935461				0+			
^{171}Er		170.938026	7.52 h	β- /1.491		5/2-	0.66	2.9	Tm k x-ray 0.11160 0.29591 0.30832 (0.08-1.4)
^{172}Er		171.939352	2.05 d	β- /0.891	0.28/48 0.36/46				Tm k x-ray 0.0597 0.4073 0.6101
^{173}Er		172.9424	1.4 m	β- /2.6		(7/2-)			Tm k x-ray

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									0.1928 0.1992 0.8952
^{174}Er		173.9441	3.1 m	β- /1.8					Tm k x-ray (0.100-0.152)
^{175}Er		174.9479	1.2 m	β^-					(0.0765-1.168)
$_{69}$Tm		**168.93421(2)**							
^{146m}Tm			0.21 s	β^+,p	p/1.118				
^{146}Tm		145.967	0.06 s	β^+ /14. p	 1.119/ 1.189/				
^{147m}Tm			0.4 ms	β^+,p	p/1.115				
^{147}Tm		146.961	0.56 s	EC, β^+ /85/≈10.7 p/15/	 1.052/				
^{148m}Tm		147.9573	0.7 s	β^+ ,EC/12.					ann.rad./
^{148}Tm									
^{149}Tm		148.9524	0.9 s	β^+ ,EC/≈9.2		11/2-			
^{150}Tm		149.9494	2.3 s	β^+ ,EC/≈11.5		6-			(0.1007-2.177)
^{151}Tm		150.9454	4. s	β^+ ,EC/7.5					ann.rad./
^{152m}Tm			8. s	β^+ ,EC/		9+			
^{152}Tm		151.9443	5. s	β^+ ,EC/8.8					ann.rad./
^{153}Tm		152.94203	1.6 s	β^+ ,EC/10 /6.46 α/90 /	 5.109/				ann.rad./
^{154m}Tm			3.3 s	β^+ ,EC/15 / α /	α/5.031/100 4.84/0.24				ann.rad./ (0.4605-0.7960)
^{154}Tm		153.9407	8.1 s	β^+ ,EC/56 /7.4 α /44 /	α/4.956/100 4.83/0.45				ann.rad./
^{155}Tm		154.93919	30. s	β^+ ,EC/5.58 α/	 4.46/				0.0315 0.0638 0.0881 0.2268 0.5320 0.6067
^{156m}Tm			19. s	α/	4.46/				
^{156}Tm		155.9389	1.40 m	β^+ ,EC/7.6 α/	 4.23/	2-	+0.40	-0.5	ann.rad./ 0.3446 0.4529 0.5860
^{157}Tm		156.9367	3.6 m	β^+ ,EC/4.5 α/	2.6 3.97/	1/2	+0.48		ann.rad./ 0.1104 0.3484 0.3855 0.4550 (0.1-1.58)
^{158}Tm		157.9379	4.0 m	β^+ ,EC/74 /6.5 EC/26 /		(2-)	+0.04	+0.7	ann.rad./ Er k x-ray 0.1921 0.3351 0.6280 1.1498 (0.18-2.81)
^{159}Tm		158.9348	9.1 m	β^+ /23 /3.9 EC/77 /		5/2+	+3.42	+1.9	ann.rad./ Er k x-ray

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									0.0591 0.0848 0.2713 (0.05-1.27)
^{160m}Tm			1.24 m	IT		(5)			
^{160}Tm		159.9354	9.4 m	β^+ /15 /5.9 EC/85 /		1-	+0.16	+0.58	ann.rad./ Er k x-ray 0.1264 0.2642 0.7285 0.8544 0.8614 1.3685
^{161}Tm		160.9334	31. m	β^+ ,EC/3.2		7/2+	+2.40	+2.9	ann.rad./ Er k x-ray 0.0595 0.0844 1.6481 (0.04-2.15)
^{162m}Tm			24. s	I.T./90 / β^+ ,EC/10 /		5+			Tm k x-ray Er k x-ray 0.0669 0.8115 0.9003
^{162}Tm		161.93394	21.7 m	β^+ /8 /4.81 EC/92 /		1-	+0.07	+0.69	ann.rad./ Er k x-ray 0.1020 0.7987 (0.1-3.75)m
^{163}Tm		162.93265	1.81 h	EC/98 /2.439 β^+ /1 /		1/2+	0.082		Er k x-ray 0.0692 0.1043 0.2414
^{164m}Tm			5.1 m	I.T./80 / β^+ ,EC/20 /		6-			0.0914 0.1394 0.2081 0.2405 0.3149
^{164}Tm		163.93345	2.0 m	β^+ /36 /3.96 EC/64 /	2.94/	1+	+2.38	+0.71	ann.rad./ Er k x-ray 0.0914
^{165}Tm		164.932433	1.253 d	EC/1.593		1/2+	0.139		Er k x-ray 0.0472 0.0544 0.29728 0.80636
^{166}Tm		165.93355	7.70 h	EC/98 /3.04 β^+ /2 /		2+	+0.092	+2.14	Er k x-ray 0.0806 0.1844 0.7789 1.2734 2.0524
^{167}Tm		166.932849	9.24 d	EC/0.748		1/2+	-0.197		Er k x-ray 0.0571 0.20778
^{168}Tm		167.934171	93.1 d	EC/1.679		3+	0.23	+3.2	Er k x-ray

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									0.19825 0.4475 0.81595
^{169}Tm	100	168.934211				1/2+	-0.2316	-1.2	
^{170}Tm		169.935798	128.6 d	β- /99.8 /0.968 EC/0.2 /0.314	0.883/24 0.968/76	1-	0.2476	+0.74	Yb k x-ray 0.08425
^{171}Tm		170.936426	1.92 y	β- /0.096	0.03/2 0.096/98	1/2+	-0.2303		0.06674
^{172}Tm		171.93840	2.65 d	β- /1.88	1.79/36 1.88/29	2-			Yb k x-ray 0.07879 1.38722 1.46601 1.52982 1.60861
^{173}Tm		172.93960	8.2 h	β- /1.298	0.80/21 0.86/71	1/2+			Yb k x-ray 0.3988 0.4613
^{174}Tm		173.94216	5.4 m	β- /3.08	0.70/14 1.20/83	(4-)			Yb k x-ray 0.07664 0.17669 0.27332 0.3666 0.99205 (0.08-1.6)
^{175}Tm		174.94383	15.2 m	β- /2.39	0.9/36 1.9/23	(1/2+)			Yb k x-ray 0.36396 0.51487 0.94125 0.98247
^{176}Tm		175.9471	1.9 m	β- /4.2	2.0/ 1.2/	(4+)			Yb k x-ray 0.1898 0.3819 1.0691
^{177}Tm		176.9490	1.4 m	β^-					
$_{70}$Yb		**173.04(3)**							
^{151}Yb		150.9545	1.6 s	β^+ /8.5					
^{152}Yb		151.9502	3.2 s	β^+ EC/5.5					
^{153}Yb		152.9492	4. s	β^+ EC/6.7					
^{154}Yb		153.9455	0.40 s	β^+ EC/7 /4.49 α/93 /	5.32/				ann.rad./
^{155}Yb		154.9456	1.7 s	β^+ ,EC/16 /6.0 α/84 /	5.19/		-0.8		ann.rad./
^{156}Yb		155.94277	26. s	β^+ ,EC/21 /3.57 α/79 /	4.69/	0+			ann.rad./
^{157}Yb		156.9427	39. s	β^+ ,EC/99+ /5.5 α/0.5 /	4.69/				ann.rad./ 0.231 (0.035-0.670)
^{158}Yb		157.93986	1.5 m	β^+ ,EC/1.9		0+			ann.rad./ 0.0741 0.2526
^{159}Yb		158.9402	1.4 m	EC,β^+ /5.1					Tm k x-ray 0.1661 0.1772

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{160}Yb		159.9376	4.8 m	β^+ ,EC/2.0		0+			0.3297 0.3903 ann.rad./ 0.1404 0.1737
^{161}Yb		160.9375	4.2 m	β^+ ,EC/3.9		3/2-	-0.33	+1.03	0.2158 ann.rad./ Tm k x-ray 0.0782 0.5999
^{162}Yb		161.9358	18.9 m	β^+ ,EC/1.7		0+			0.6315 ann.rad./ Tm k x-ray 0.1188 0.1635
^{163}Yb		162.9363	11.1 m	β^+ /26 /3.4	1.4/	3/2-	-0.37	+1.2	ann.rad./ Tm k x-ray 0.0636 0.8603 (0.06-1.9)
^{164}Yb		163.9345	1.26 h	EC/1.0		0+			Tm k x-ray 0.0914 0.6752
^{165}Yb		164.93540	9.9 m	β^+ /10 /2.76 EC/90 /	1.58/	(5/2-)	+0.48	+2.48	ann.rad./ Tm k x-ray 0.0801 1.0903
^{166}Yb		165.93388	2.363 d	EC/0.30		0+			Tm k x-ray 0.0828 0.1844 0.7789 1.2734 2.0524
^{167}Yb		166.934947	17.5 m	β^+ /0.5 /1.954 EC/99.5 /	0.639/	5/2-	+0.62	+2.70	Tm k x-ray 0.06296 0.10616 0.11337 0.17633
^{168}Yb	0.13(1)	167.933895				0+			
^{169m}Yb			46. s	I.T./0.0242		1/2-			Yb L x-ray 0.0242
^{169}Yb		168.935187	32.03 d	EC/0.909		7/2+	-0.63	+3.5	Tm k x-ray (0.0498-0.3078)
^{170}Yb	3.05(6)	169.934759				0+			
^{171}Yb	14.3(2)	170.936323				1/2-	+0.49367		
^{172}Yb	21.9(3)	171.936378				0+			
^{173}Yb	16.12(21)	172.938207				5/2-	-0.67989	+2.80	
^{174}Yb	31.8(4)	173.938858				0+			
^{175}Yb		174.941273	4.19 d	β- /0.470	0.466/73 0.071/21 0.353/6.2	7/2-	0.6		Lu k x-ray 0.3963/13 (0.114-0.28)
^{176m}Yb			11.4 s	I.T./1.051		(8-)			Yb k x-ray 0.0961 0.1901 0.2929 0.3897

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{176}Yb	12.7(2)	175.942569				0+			
^{177m}Yb			6.41 s	I.T./0.3315		1/2-			Yb k x-ray 0.1131 0.2084
^{177}Yb		176.945257	1.9 h	β- /1.399	1.40	9/2+			Lu k x-ray 0.1504
^{178}Yb		177.94664	1.23 h	β- /0.65	0.25/	0+			0.1415 0.3246 0.3516 0.3815 0.6125
^{179}Yb		178.9499	8. m	β- /2.4					
^{180}Yb		179.9523	2. m	β-					(0.1028-0.4423)
$_{70}$Lu		**174.967(1)**							
^{150}Lu		149.973	≈35. ms	p					
^{151}Lu		150.967	0.08 s	p/1.231					
^{152}Lu		151.963	0.7 s						
^{153}Lu		152.959							
^{154}Lu		153.9571	1.0 s	β^+ ,EC/10.8					
^{155m}Lu			2.6 ms	α/7.41					
^{155}Lu		154.9542	0.07 s	EC/8.0					
				α/	5.66/90				
^{156m}Lu			0.20 s	α/	5.57/				
^{156}Lu		155.9529	≈ 0.5 s	β^+ ,EC/9.5					ann.rad./
				α/	5.45/				
^{157m}Lu			≈9.6 s	α	4.925/				
^{157}Lu		156.95010	4.8 s	β^+ ,EC/94 /6.93					ann.rad./
				α/	5.00/				
^{158}Lu		157.94984	10.4 s	β^+ ,EC/99 /8.0					ann.rad./
				α/	4.67/				0.3682 0.4770
^{159}Lu		158.9467	12.3 s	β^+ ,EC/6.0					ann.rad./ 0.1505 0.1875 0.3693
^{160}Lu		159.94654	36.1 s	β^+ ,EC/7.3					ann.rad./ 0.2434 0.3957 0.5773
^{161}Lu		160.9432	1.2 m	β^+ ,EC/5.3					ann.rad./ 0.0437 0.0671 0.1003 0.1108 0.1562 0.2562
^{162m}Lu			≈ 1.5 m	EC/		4-			
^{162}Lu		161.9432	1.37 m	β^+ ,EC/6.9		1-			ann.rad./ 0.1666 0.6314
^{163}Lu		162.9412	4.1 m	β^+ ,EC/4.6					ann.rad./

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.0539 0.0581 0.1504 0.1631 0.3717
^{164}Lu		163.9412	3.14 m	β^+ ,EC/6.3	1.6/ 3.8/				0.1238 0.2621 0.7404 0.8639 0.8804
^{165}Lu		164.9396	10.7 m	β^+ ,EC/3.9	2.06/	1/2+			ann.rad./ 0.1206 0.1324 0.1742 0.2036
^{166m2}Lu			2.1 m	β^+ /35 / EC/65 /		(0-)			(0.04-2.0) ann.rad./ Yb k x-ray
^{166m1}Lu			1.4 m	β^+ ,EC/58 / I.T./42 /0.0344		(3-)			1.0673 1.2566 2.0986
^{166}Lu		165.9398	2.8 m	β^+ /25 /5.5 EC/75 /		(6-)			ann.rad./ 0.1024 0.2281 0.2861 0.8119 0.8301
^{167}Lu		166.9383	52. m	β^+ /2 /3.1 EC/98 /	2.1/	7/2+			ann.rad./ Yb k x-ray 0.1024 0.2281 0.3375 0.3679
^{168m}Lu			6.7 m	β^+ /12 / EC/88 /		3+			Yb k x-ray 0.0297 0.2392 (0.03-2.0) ann.rad./ Yb k x-ray
^{168}Lu		167.9387	5.5 m	β^+ /6 /4.5 EC/94 /	1.2/	(6-)			0.1988 0.8960 0.9792 ann.rad./ Yb k x-ray 0.1114 0.1124 0.2286 0.3483
^{169m}Lu			2.7 m	I.T./0.0290		1/2-			1.4836 Lu L x-ray 0.0290
^{169}Lu		168.93765	1.419 d	EC/2.293	1.271/	7/2+	2.30	3.4	Yb k x-ray 0.19121 0.9606 (0.08-2.1)
^{170m}Lu			0.7 s	I.T./0.0929		4-			Lu L x-ray

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.04449
									0.0484
^{170}Lu		169.93847	2.01 d	EC/3.46	2.44/	0+			Yb k x-ray
									0.58711
									0.5908
									1.28029
									(0.1-3.38)
^{171m}Lu			1.31 m	I.T./0.0711		1/2-			Lu k x-ray
									0.07119
^{171}Lu		170.937910	8.24 d	EC/1.479	0.362/	7/2+	2.31	3.38	Yb k x-ray
									0.01939
									0.66744
									(0.02-1.3)
^{172m}Lu			3.7 m	I.T./0.0419		1-			Lu L x-rays
									0.04186
^{172}Lu		171.939082	6.70 d	EC/2.519		4-	2.89	3.79	Yb k x-ray
									0.18156
									1.09367
									(0.07-2.2)
^{173}Lu		172.938927	1.37 y	EC/0.671		7/2+	2.28	3.56	Yb k x-ray
									0.07860
									0.27198
^{174m}Lu			142. d	I.T./99.3 /0.17086			6-	1.5	Lu k x-ray
				EC/0.7 /					0.067055
^{174}Lu		173.940334	3.3 y	EC/1.374		1-	1.9		Yb k x-ray
									0.07664
									1.2419
^{175}Lu	97.41(2)	174.940768				7/2+	+2.2327	+3.49	
^{176m}Lu			3.66 h	β- /1.315	1.229/	1-	+0.318	-1.47	Hf k x-ray
					1.317/				0.088372
^{176}Lu	2.59(2)	175.942683	3.8x10^{10} y	β- /1.192		7-	+3.169	+4.92	Hf k x-ray
									0.20187
									0.30691
^{177m}Lu			160.7 d	I.T./22 /0.9702		23/2-	2.34	5.2	Lu k x-ray
				β- /78					Hf k x-ray
									0.11295
									0.20836
									0.37850
									0.41853
^{177}Lu		176.943755	6.75 d	β- /0.498	0.497/	7/2+	+2.239	+3.39	0.11295
									0.20836
^{178m}Lu			23.1 m	β- /		(9-)			0.2166
									0.3317
^{178}Lu		177.945952	28.5 m	β- /2.099	2.03/	1+			Hf k x-ray
									0.0932
									1.3099
									1.3408
									(0.09-1.7)
^{179}Lu		178.94732	4.6 h	β- /1.405	1.35/	7/2+			0.2143
									0.3377
^{180}Lu		179.9499	5.7 m	β- /3.1	1.49/				0.40795/50.
									(0.07-1.9)
^{181}Lu		180.9518	3.5 m	β- /2.5		(7/2+)			0.0458
									0.2059
									0.5749
^{182}Lu		181.9552	2.0 m	β- /≈ 4.1					0.0978

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.7208 0.8182
^{183}Lu		182.9576	58. s	β- /		7/2+			
^{184}Lu		183.9612	20 s	β^-					
$_{72}$Hf		**178.49(2)**							
^{154}Hf		153.964	2. s	EC,β^+ /≈ 6.7					
^{155}Hf		154.963	0.9 s	EC,β^+ /8.					
^{156}Hf		155.9593	25. ms	α/					
^{157}Hf		156.9581	0.11 s	α/					
^{158}Hf		157.9539	2.9 s	EC/54 /5.1 α/46 /	5.27/	0+			
^{159}Hf		158.9538	5.6 s	β^+ ,EC/88 /6.9 α/12 /	5.09/				ann.rad./
^{160}Hf		159.95063	≈ 12. s	β^+ ,EC/97 /4.9 α /4.78		0+			ann.rad./
^{161}Hf		160.9503	17. s	α/	4.60/				
^{162}Hf		161.94720	38. s	β^+ ,EC/3.7		0+			ann.rad./ 0.1739 0.1963 0.4101
^{163}Hf		162.9471	40. s	β^+ ,EC/5.5					ann.rad./ 0.0454 0.0621 0.0710 0.6882
^{164}Hf		163.9536	2.8 m	EC,β^+ /3.0					
^{165}Hf		164.9445	1.32 m	EC/4.6		11/2-			
^{166}Hf		165.9423	6.8 m	EC/93 /2.3 β^+ /7 /					ann.rad./ Lu k x-ray 0.0788
^{167}Hf		166.9426	2.0 m	β^+ /40 /4.0 EC/60 /		(5/2-)			ann.rad./ Lu k x-ray 0.1754 0.3152
^{168}Hf		167.9406	25.9 m	β^+ ,EC/1.8		0+			ann.rad./ (0.0144-1.311)
^{169}Hf		168.9412	3.25 m	EC/85 /3.3 β^+ /15 /		(5/2-)			ann.rad./ Lu k x-ray 0.3695 0.4929
^{170}Hf		169.9397	16.0 h	EC/1.1		0+			Lu k x-ray 0.0985 0.1202 0.1647 0.5729 0.6207
^{171m}Hf			30. s						
^{171}Hf		170.9405	12.2 h	EC,β^+ /2.4		7/2+			ann.rad./ Lu k x-ray 0.1221 0.6620 1.0714
^{172}Hf		171.93946	1.87 y	EC/0.35		0+			Lu k x-ray

TABLE OF THE ISOTOPES

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									0.02399 0.12582 (0.0818-0.123)
^{173}Hf		172.9407	23.6 h	EC/1.6		1/2-			Lu k x-ray 0.12367 0.13963 0.29697 0.31124 (0.1-2.1)
^{174}Hf	0.162(3)	173.940042	2.0×10^{15} y			0+			
^{175}Hf		174.941504	70. d	EC/0.686		5/2-	-0.62	+2.6	Lu k x-ray 0.08936 0.34340
^{176}Hf	5.206(5)	175.941403				0+			
^{177m2}Hf			51.4 m	I.T./2.740		37/2-			Hf k x-ray 0.2140 0.2951 0.3115 0.3267
^{177m1}Hf			1.1 s	I.T./		23/2+			Hf k x-ray 0.20836 0.22847 0.37851
^{177}Hf	18.606(4)	176.943220				7/2-	+0.7935	+0.337	
^{178m2}Hf			31. y	I.T./		16+	+8.2	+6.0	Hf k x-ray 0.32555 0.42635 (0.0889-0.5742)
^{178m1}Hf			4.0 s	I.T./		8-			Hf k x-ray 0.21342 0.32555 0.42635
^{178}Hf	27.297(4)	177.943698				0+			
^{179m2}Hf			25.1 d	I.T./1.1057		25/2-	7.4		Hf k x-ray 0.1227 0.1461 0.3626 0.4537
^{179m1}Hf			18.7 s	I.T./0.375		1/2-			Hf k x-ray 0.1607 0.2141
^{179}Hf	13.629(6)	178.945815				9/2+	-0.6409	+3.79	
^{180m}Hf			5.52 h	I.T./1.1416		8-	+8.7	+4.6	Hf k x-ray 0.2152 0.3323 0.4432
^{180}Hf	35.100(7)	179.946549				0+			
^{181}Hf		180.949099	42.4 d	β- /1.027	0.408/	1/2-			Ta k x-ray 0.13294 0.48200
^{182m}Hf			62. m	β- /54 /1.60 I.T./46 /1.1729	0.49/43 0.95/10	8-			Hf k x-ray 0.0509 0.2244 0.3441 0.4558 0.5066

TABLE OF THE ISOTOPES

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									0.9428
^{182}Hf		181.95055	9.x10^{6} y	β- /0.37		0+			Ta k x-ray
									0.2704
^{183}Hf		182.95353	1.07 h	β- /2.01	1.18/68	3/2-			Ta k x-ray
					1.54/25				0.0732
									0.4591
									0.7837
^{184}Hf		183.95545	4.1 h	β- /1.34	0.74/38	0+			Ta k x-ray
					0.85/16				0.0414
					1.10/46				0.1391
									0.3449
^{185}Hf		184.9588	≈3.5m	β- /					0.165
$_{73}$Ta		**180.9479(1)**							
^{156}Ta		155.972	0.11 s	β^+ /≈11.6					
				p/	1.02/≈100				
^{157}Ta		156.968	10 ms	α/	6.117				
				p/	0.927/3.4				
^{158}Ta		157.9664	37. ms	α/	6.05/100				
					5.97/100				
^{159}Ta		158.9629	0.6 s	β^+ ,EC/20 /8.5	α/5.52/34				ann.rad./
				α/80 /	5.60/55				
^{160}Ta		159.9615	1.4 s	β^+ ,EC/10.1					ann.rad./
				α	5.41/				
^{161}Ta		160.9584	2.9 s	β^+ ,EC/7.5					ann.rad./
				α/	5.15				
^{162}Ta		161.9564	4. s	EC/8.6					
^{163}Ta		162.9544	10.6 s	EC/6.8					
^{164}Ta		163.9536	14.2 s	β^+ /8.5		3+			ann.rad./
				α/	4.62/				0.2110
									0.3768
^{165}Ta		164.9508	31. s	ECβ^+ /5.9					
^{166}Ta		165.9505	34. s	β^+ /82 /7.7					ann.rad./
				EC/18 /					Hf k x-ray
									0.1587
									0.3117
									0.8101
^{167}Ta		166.9486	1.4 m	β^+ ,EC/5.6					ann.rad./
^{168}Ta		167.9478	2.4 m	β^+ /77 /6.7		3+			ann.rad./
				EC/23 /					Hf k x-ray
									0.1239
									0.2615
									0.7502
^{169}Ta		168.9459	4.9 m	β^+ ,EC/4.4					ann.rad./
									0.0288
									0.1535
									0.1924
^{170}Ta		169.9461	6.8 m	β^+ /70 /6.0		(3+)			ann.rad./
				EC/35 /					Hf k x-ray
									0.1008
									0.2212
^{171}Ta		170.9445	23.3 m	β^+ ,EC/3.7		(5/2-)			0.0496
									0.5018
									0.5064

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^{172}Ta		171.9447	36.8 m	β^+ /25 /4.9 EC/75 /		(3-)			(0.05-1.02) ann.rad./ Hf k x-ray 0.21396 1.10923
^{173}Ta		172.9446	3.6 h	β^+ /24 /3.7 EC/76 /		(5/2-)	1.7	-1.9	(0.09-3.8) ann.rad./ Hf k x-ray 0.06972 0.17219
^{174}Ta		173.9442	1.12 h	β^+ /27 /3.8 EC/73 /		(3+)			(0.06-2.7) ann.rad./ Hf k x-ray 0.09089 0.20638
^{175}Ta		174.9437	10.5 h	EC/2.0		7/2+	2.27	+3.7	(0.09-3.64) Hf k x-ray 0.2077 0.2671 0.3487
^{176}Ta		175.9447	8.1 h	EC/3.1		1-			Hf k x-ray 0.08837 1.15735
^{177}Ta		176.944472	2.356 d	EC/1.166		7/2+	2.25		Hf k x-ray 0.11295
^{178m}Ta			2.4 h	EC/		(7-)			(0.07-1.06) Hf k x-ray 0.08886 0.21342 0.32555 0.42635
^{178}Ta		177.9458	9.29 m	EC/99 /1.9 β^+ /1 /		1+	+2.74	+0.65	ann.rad./ Hf k x-ray 0.09316
^{179}Ta		178.94593	1.8 y	EC/0.110		7/2+	2.29	3.37	Hf k x-ray
^{180m}Ta	0.012(2)		> $1.2x10^{15}$ y				(9-)	4.77	
^{180}Ta		179.947466	8.15 h	EC/87 /0.854 β- /13 /0.708	0.61/3 0.71/10	1+			Hf k x-ray W k x-ray 0.09333 0.10340
^{181}Ta	99.988(2)	180.947996				7/2+	+2.370	+3.3	
^{182m}Ta			15.8 m	I.T./0.5198		10-			Ta k x-ray 0.14678 0.17157
^{182}Ta		181.950152	114.43 d	β- /1.814	0.25/30 0.44/20 0.52/40	3-	+3.02		W k x-ray 0.06775 0.10010 1.12127 1.22138
^{183}Ta		182.951373	5.1 d	β- /1.070	0.45/5 0.62/91	7/2+	+2.36		W k x-ray 0.0847 0.0991 0.1079 0.2461 0.3540
^{184}Ta		183.95401	8.7 h	β- /2.87	1.11/15	(5-)			W k x-ray

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
					1.17/81				0.2528/44. 0.4140/74. (0.09-1.4)
^{185}Ta		184.95556	49. m	β- /1.99	1.21/5 1.77/81	(7/2+)			W k x-ray 0.0697 0.1739 0.1776
^{186}Ta		185.9586	10.5 m	β- /3.9	2.2/	(3-)			W k x-ray 0.1979 0.2149 0.5106 (0.09-1.5)
$_{74}$W		**183.84(1)**							
^{158m}W			<1. ms	α	8.28(3)/				
^{158}W		157.974	0.9 ms	α/	6.433				
^{159}W		158.972	7. ms	α/					
^{160}W		159.9684	0.08 s	α/	5.92/	0+			
^{161}W		160.9671	0.41 s	β^+ ,EC/18 /8.1 α/82 /	5.78/				
^{162}W		161.9626	1.39 s	β^+ ,EC/54 /5.8 α/46 /	5.54/	0+			
^{163}W		162.9624	2.8 s	β^+ ,EC/59 /7.5 α/41 /	5.38/				
^{164}W		163.95890	6. s	β^+ ,EC/97 /5.0 α/3 /	5.15/	0+			ann.rad./
^{165}W		164.9583	5.1 s	β^+ ,EC/99 /7.0 α/1 /	4.91/				ann.rad./
^{166}W		165.95502	16. s	β^+ ,EC/99 /4.2 α/1 /	4.74/	0+			ann.rad./
^{167}W		166.9547	20. s	EC/5.6					
^{168}W		167.9519	53. s	EC/3.8 α/10^{-5}/	4.40(1)				ann.rad./ Ta k x-ray 0.1755 (0.037-0.573)
^{169}W		168.9518	1.3 m	EC/5.4					ann.rad./ Ta k x-ray 0.123 (0.097-0.699)
^{170}W		169.9485	2.4 m	EC/2.2					ann.rad./ Ta k x-ray 0.3162 (0.060-0.144)
^{171}W		170.9494	2.4 m	EC/4.6					ann.rad./ Ta k x-ray 0.1842 (0.052-0.479)
^{172}W		171.9474	6.6 m	β^+ ,EC/2.5					ann.rad./ Ta k x-ray 0.0389 (0.034-0.674)
^{173}W		172.9489	6.3 m	EC/4.0					ann.rad./ Ta k x-ray 0.4576

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{174}W		173.9462	35. m	EC/1.9		0+			(0.035-0.623) ann.rad./ Ta k x-ray 0.3287 0.4288
^{175}W		174.9468	35. m	EC/2.9		1/2-			(0.056-0.429) (0.015-0.27)
^{176}W		175.9456	2.5 h	β^+ ,EC/0.8		0+			0.03358 0.06129 0.09487 0.10020
^{177}W		176.9466	2.21 h	EC/2.0		(1/2-)			Ta k x-ray 0.15505 0.18569 0.42694
^{178}W		177.9459	21.6 d	EC/0.091		0+			Ta k x-ray
^{179m}W			6.4 m	I.T./99.7 /0.222 EC/0.3 /		(1/2-)			W k x-ray 0.2220
^{179}W		178.94707	38. m	EC/1.06		(7/2-)			Ta k x-ray 0.0307
^{180}W	0.120(1)	179.946706	7.4×10^{16} y	α/		0+			
^{181}W		180.94820	121.2 d	EC/0.188		9/2+			Ta k x-ray 0.13617 0.15221
^{182}W	26.498(29)	181.948205	8.3×10^{18} y	α/		0+			
^{183m}W			5.15 s	I.T./		(11/2+)			W k x-ray 0.0465 0.0526 0.0991 0.1605
^{183}W	14.314(4)	182.950224	1.9×10^{18} y	α/		1/2-	+0.1177848		
^{184}W	30.642(8)	183.950932	4.0×10^{18} y	α/		0+			
^{185m}W			1.6 m	I.T./0.1974		11/2+			W k x-ray 0.0659 0.1315 0.1737
^{185}W		184.953420	74.8 d	β- /0.433	0.433/99.9	3/2-			0.12536
^{186}W	28.426(37)	185.954362	6.5×10^{18} y	α/		0+			
^{187}W		186.957158	23.9 h	β- /1.311	0.624/ 1.315/	3/2-	0.62		Re k x-ray 0.0725 0.47951 0.68572
^{188}W		187.958487	69.4 d	β- /0.349	0.349/99	0+			0.0636 0.2271 0.2907
^{189}W		188.9619	11.5 m	β- /2.5	1.4/ 2.5/	(3/2-)			(0.1262-1.466)
^{190}W		189.9632	30. m	β- /1.3	0.95/	0+			Re k x-ray 0.1576 0.1621
$_{75}$Re		**186.207(1)**							
^{160}Re		159.981	0.7 ms	p/ α/	1.261(6)/91 6.54/				

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{161}Re		160.978	14 ms	α/	6.24				
				p	1.35				
^{162}Re		161.9757	0.10 s	α/	6.12/94				
					6.09/94				
^{163}Re		162.9721	0.26 s	β^+ ,EC/9.0	α/5.87/32				
				α/	5.92/66				
^{164}Re		163.9704	0.9 s	β^+ ,EC/10.7					
				α/	5.78/				
^{165}Re		164.9671	2. s	β^+ ,EC/87 /8.1					
				α/	5.51/				
^{166}Re		165.9651	2.5 s	β^+ ,EC/9.4					
				α/	5.50/				
^{167m}Re			6.2 s	α, EC/					
^{167}Re		166.9626	3.4 s	β^+ ,EC/7.4					
				α/	5.015/				
^{168}Re		167.9616	4.4 s	β^+ ,EC/9.1					
				α/	4.833/				0.1117
^{169m}Re			8.1 s	α	4.70/				
					4.87/				
^{169}Re		168.9588	16. s						
^{170}Re		169.9582	9.2 s	β^+, EC/9.0					0.1560
									0.3055
									0.4125
^{171}Re		170.9555	15.2 s	EC/≈ 5.7					
^{172m}Re			55. s	β^+ ,EC/		(2)			ann.rad./
									0.1234
									0.2537
									0.3504
^{172}Re		171.9553	15. s	β^+ ,EC/7.3					ann.rad./
									0.1234
									0.2537
^{173}Re		172.9531	2.0 m	EC/≈3.9					ann.rad./
^{174}Re		173.9521	2.4 m	β^+ ,EC/5.6					ann.rad./
									0.1119
									0.2430
^{175}Re		174.9514	5.8 m	β^+ ,EC/4.3					ann.rad./
^{176}Re		175.9516	5.3 m	β^+ ,EC/5.6		(3+)			ann.rad./
									0.1089
									0.2406
^{177}Re		176.9503	14. m	EC/78 /3.4		(5/2-)			ann.rad./
				β^+ /22 /					W k x-ray
									0.0797
									0.0843
									0.1968
^{178}Re		177.9509	13.2 m	β^+ /11 /4.7	3.3/	(3)			ann.rad./
				EC/89 /					W k x-ray
									0.1059
									0.2373
									0.9391
^{179}Re		178.9500	19.7 m	EC/99 /2.71	0.95/	(5/2+)			W k x-ray
				β^+ /1 /					0.1199
									0.2900
									0.4154
									0.4302
									1.6803

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{180}Re		179.95079	2.45 m	EC/92 /3.80 β^+ /8 /	1.76/	1-			ann.rad./ W k x-ray 0.1036 0.9028 (0.07-2.2)
^{181}Re		180.95006	20. h	EC /1.74		5/2+	3.19		W k x-ray 0.3607 0.3655 0.6390
^{182m}Re			12.7 h	EC/	0.55/ 1.74/	2+	3.3	+1.8	W k x-ray 0.0677 1.1214 1.2215 (0.06-2.2)
^{182}Re		181.9512	2.67 d	EC/2.8		(7+)	2.8	+4.1	W k x-ray 0.0678 0.2293 1.1213 1.2214
^{183}Re		182.95082	70. d	EC/0.56		(5/2+)	+3.17	+2.3	W k x-ray 0.16232
^{184m}Re			165. d	I.T./75 /0.188 EC/25 /		8+	+2.9		Re k x-ray 0.1047 0.2165 0.92093 (0.10-1.1)
^{184}Re		183.95252	38. d	EC/1.48		3-	+2.53	+2.8	W k x-ray 0.79207 0.90328 (0.1-1.4)
^{185}Re	37.40(2)	184.952955				5/2+	+3.1871	+2.18	
^{186m}Re			2.0×10^5 y	I.T./0.150		8+			Re k x-ray 0.0590
^{186}Re		185.954986	3.718 d	β- /92 /1.070 EC/8 /0.582	0.973/21 1.07/71	1-	+1.739	+0.62	W k x-ray 0.1227/0.6 0.1372/9.5 (0.63-0.77)
^{187}Re	62.60(2)	186.955751	4.4×10^{10} y	β- /0.00266	0.0025/	5/2+	+3.2197	+2.07	
^{188m}Re			18.6 m	I.T./0.172		(6-)			Re k x-ray 0.0925 0.1059
^{188}Re		187.958112	16.94 h	β- /2.120	1.962/20 2.118/79	1-	+1.788	+0.57	Os k x-ray 0.15502
^{189}Re		188.959228	24. h	β- /1.01	1.01/	(5/2+)			0.1471 0.2167 0.2194 0.2451
^{190m}Re			3.0 h	β- /51 / I.T./49 /		(6-)			Re k x-ray 0.1191 0.2238 0.6731 (0.1-1.79)
^{190}Re		189.9618	3.0 m	β- /3.2	1.8/	(2-)			Os k x-ray 0.1867 0.5580 0.6051

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{191}Re		190.96312	9.7 m	β- /2.05	1.8/				
^{192}Re		191.9660	16. s	β- /4.2	≈ 2.5/				(0.2-0.75)
$_{76}$Os		**190.23(3)**							
^{162}Os		161.984	1.5 ms	α/	6.62				
^{163}Os		162.982	5.5 ms	α/	6.51				
^{164}Os		163.9779	0.04 s	α					
^{165}Os		164.9765	0.07 s	α					
^{166}Os		165.9718	0.18 s	β^+ ,EC/28 /6.3 α/72 /	6.27/ 5.98/	0+			ann. rad./
^{167}Os		166.9714	0.7 s	β^+ ,EC/76 /8.2 α/24 /	5.84/				ann.rad./
^{168}Os		167.96775	2.2 s	β^+ ,EC/51 /5.7 α/49 /		0+			ann. rad./
^{169}Os		168.9671	3.3 s	β^+ ,EC/89 /7.7 α/13 /	5.57/80 5.51/12 5.54/8				ann.rad./
^{170}Os		169.96357	7.1 s	β^+ ,EC/5.0 α/	5.40/	0+			ann.rad./ (0.162-0.216)
^{171}Os		170.9630	8.4 s	β^+ ,EC/98 /7.1 α/19 /	α/5.24/93.5 5.17/6.5				ann.rad./ (0.1898-0.7050)
^{172}Os		171.9601	19. s	β^+ ,EC/99 /4.5 α/1.1/	5.10/	0+			ann.rad./ (0.063-1.120)
^{173}Os		172.9598	16. s	β^+ ,EC/6.3 α/0.4 /	4.94/				ann.rad./ (0.1416-0.2993)
^{174}Os		173.9563	44. s	β^+ ,EC/3.9 α/0.02 /	4.76/	0+			0.118 0.138 / 0.001 0.158 0.325
^{175}Os		174.9570	1.4 m	β^+ ,EC/5.3					0.125 0.181 0.248
^{176}Os		175.9550	3.6 m	β^+ ,EC/3.2		0+			0.8155 0.7758 0.8573 1.2093 1.2909
^{177}Os		176.9551	2.8 m	β^+ ,EC/4.5		(1/2-)			0.0848 0.1958 0.3002 1.2686
^{178}Os		177.9534	5.0 m	β^+ ,EC/2.3		0+			ann.rad./ 0.5946 0.6850 0.9687 1.3311
^{179}Os		178.9539	7. m	β^+ ,EC/3.7					ann.rad./ 0.0654 0.2186 0.5938
^{180}Os		179.9524	21.5 m	β^+ ,EC/1.5		0+			Re k x-ray 0.0202-0.7174
^{181m}Os			1.75 h	EC/		(1/2-)			ann.rad./ 0.0489

TABLE OF THE ISOTOPES

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^{181}Os		180.9532	2.7 m	EC/2.9		(7/2-)			ann.rad./ 0.11794 0.23868 0.8267 (0.07-2.64)
^{182}Os		181.95219	21.5 h	EC/0.9		0+			Re k x-ray 0.1802 0.5100
^{183m}Os			9.9 h	EC/84 / I.T./16 /		1/2-			Os k x-ray Re k x-ray 1.1020 1.1080
^{183}Os		182.9531	13. h	EC/2.1		9/2+	-0.79	+3.1	Re k x-ray 0.1144 0.3818
^{184}Os	0.020(3)	183.952491				0+			
^{185}Os		184.954043	93.6 d	EC/1.013		1/2-			Re k x-ray 0.6461 0.8748 0.8805
^{186}Os	1.58(10)	185.953838	2.x10^{15} y	α/	≈ 2.75/	0+			
^{187}Os	1.6(1)	186.955748				1/2-	+0.0646519		
^{188}Os	13.3(2)	187.955836				0+			
^{189m}Os			5.8 h	I.T./0.0308		9/2-			Os L x-ray 0.0308
^{189}Os	16.1(3)	188.958145				3/2+	+0.65993	+0.86	
^{190m}Os			9.9 m	I.T./1.705		10-	-0.6		Os k x-ray 0.1867 0.3611 0.5026 0.6161
^{190}Os	26.4(4)	189.958445				0+			
^{191m}Os			13.1 h	I.T./0.0744		3/2-			Os k x-ray 0.0744
^{191}Os		190.960928	15.4 d	β- /0.314	0.140/100	9/2-		+2.5	Ir k x-ray 0.1294
^{192m}Os			6.0 s	I.T./2.0154		(10-)			Os k x-ray 0.2058/65.9 0.5692/70 (0.201-1.000)
^{192}Os	41.0(3)	191.961479				0+			
^{193}Os		192.964148	30.5 h	β- /1.141	1.04/20	3/2-	+0.730	+0.47	Ir k x-ray 0.1389 0.4605
^{194}Os		193.965179	6.0 y	β- /0.097	0.054/33 0.096/67	0+			Ir L x-ray 0.0429
^{195}Os		194.9681	6.5 m	β- /2.0	2.0/				
^{196}Os		195.96962	34.9 m	β- /1.16	0.84/	0+			0.1262/5 0.4079/5.9
$_{77}$Ir		**192.217(3)**							
^{165}Ir		164.9876	0.3 ms	p/87 α/13	1.71 6.72				
^{166m}Ir			15 ms	α/98.2 p/1.8	6.56 1.32				

TABLE OF THE ISOTOPES

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^{166}Ir		165.9855	≈ 11 ms	α/93	6.56				
				p/6.9	1.15				
^{167m}Ir			30 ms	α/48,β^+	6.35				
				p/32	1.06				
^{167}Ir		166.9817	35. ms	α/80,β^+	6.41				
				p/0.4	1.24				
^{168}Ir		167.9799		α/					
^{169}Ir		168.9764	0.4 s	α/					
^{170}Ir		169.9743	1.0 s	α/	6.03/				
^{171}Ir		170.9718	1.5 s	α/	5.91/				
^{172}Ir		171.9706	2.1 s	α/	5.811/				0.228 (0.379-0.475)
^{173}Ir		172.9677	3.0 s	α/	5.665/				0.0493 (0.092-0.296)
^{174}Ir		173.9668	4. s	α/	5.478/				0.1587 (0.276-1.33)
^{175}Ir		174.9641	≈ 4.5 s	α/	5.393/				0.1056
^{176}Ir		175.9635	8. s	EC, β^+/80					0.260 (0.135-0.415)
				α/3.2/	5.118/				
^{177}Ir		176.9612	30. s	EC, β^+/5.7					0.184 (0.062-0.194)
				α/0.06/	5.011/				
^{178}Ir		177.9601	12. s	β^+ ,EC/6.3					0.1320 0.2667 0.3633
^{179}Ir		178.9592	4. m	EC/4.9					0.0975 (0.045-0.220)
^{180}Ir		179.9593	1.5 m	EC/6.4					0.2765 ((0.132-1.106)
^{181}Ir		180.9576	4.9 m	β^+ ,EC/4.1		(7/2+)			ann.rad./ 0.1076 (0.0196-1.715)
^{182}Ir		181.9582	15. m	β^+ /44 /5.6 EC/56 /					ann.rad./ Os k x-ray 0.1273 0.2370
^{183}Ir		182.9568	57. m	β^+ ,EC/3.5					ann.rad./ 0.0877 0.2285 0.2824
^{184}Ir		183.9574	3.0 h	β^+ /12 /4.6 EC/88 /	2.3/ 2.9/	5-	0.70	+2.0	ann.rad./ Os k x-ray 0.11968 0.2640 0.3904
^{185}Ir		184.9566	14. h	β^+ /3 /2.4 EC/97 /		(5/2-)	2.60	-2.1	ann.rad./ Os k x-ray 0.2543 1.8288
^{186m}Ir			1.7 h	EC /		(2-)			Os k x-ray 0.1371 0.7675
^{186}Ir		185.95795	15.7 h	EC/98 /3.83 β^+ /2 /		(5+)	3.9	-2.5	Os k x-ray 0.1372 0.2968

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									0.4348
									(0.13-3.0)
^{187}Ir		186.95736	10.5 h	EC/1.50		3/2+			Os k x-ray
									0.0743
									0.4009
									0.4271
									0.6109
									0.9128
^{188}Ir		187.95885	1.72 d	β^+ /2.81	1.13/	(2-)	0.30	+5.4	Os k x-ray
				EC/99+ /	1.64/				0.1550
									0.4780
									0.6330
									2.2146
^{189}Ir		188.95872	13.2 d	EC/0.53		3/2+	0.13	+1.0	Os k x-ray
									0.2449
^{190m2}Ir			3.09 h	β^+ ,EC/95 /		(11-)			0.376
				I.T./5 /					
^{190m1}Ir			1.12 h	I.T. /0.0263		7+			Ir L x-ray
^{190}Ir		189.9606	11.8 d	EC/2.0		(4+)	0.04	+2.8	Os k x-ray
									0.1867
									0.4072
									0.5186
									0.5580
									0.6051
									(0.2-1.4)
^{191m}Ir			4.93 s	I.T./0.1714		11/2-	0.603		Ir k x-ray
									0.1294
^{191}Ir	37.3(5)	190.960591				3/2+	+0.151	+0.82	
^{192m2}Ir			241. y	I.T./0.161		(9+)			Ir k x-ray
^{192m1}Ir			1.44 m	I.T./0.0580		(1+)			Ir L x-ray
									0.0580
									0.3165
^{192}Ir		191.962602	73.83 d	β- /1.460		(4-)	+1.92	+2.3	Pt k x-ray
									0.31649/83.
									0.46806/48.
^{193m}Ir			10.53 d	I.T./0.0802		11/2-			Ir L x-ray
									0.0803
^{193}Ir	62.7(5)	192.962923				3/2+	+0.164	+0.75	
^{194m}Ir			170. d	β- /		11			Pt k x-ray
									0.3284
									0.4829
									0.5624
^{194}Ir		193.965075	19.3 h	β- /2.247	1.92/9	1-	0.39	+0.34	0.2935
					2.25/86				0.3284
									0.6451
									(0.1-2.2)
^{195m}Ir			3.9 h	β- /	0.41/	(11/2-)			Pt k x-ray
					0.97/				0.3199/9.6
									0.3649/9.5
									0.4329/9.6
									0.6849/9.6
^{195}Ir		194.965976	2.8 h	β- /1.120	1.0/80	(3/2+)			Pt k x-ray
					1.11/13				0.0989/9.7
^{196m}Ir			1.40 h	β- /	1.16/				Pt k x-ray
									0.3557
									0.3935

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.4471
									0.5214
									0.6473
^{196}Ir		195.96838	52.s	β- /3.21	2.1/15	0-			0.3329
					3.2/80				0.3557
									0.7796
^{197m}Ir			8.9 m	β- /		(11/2-)			0.3465
				I.T./					See Ir[197]
^{197}Ir		196.96964	5.8 m	β- /2.16	1.5/	(3/2+)			0.0531
					2.0/				0.1351
									0.4306
									0.4697
^{198}Ir		197.9723	8. s	β- /4.1					0.4074
									0.5070
$_{78}$Pt		**195.078(2)**							
^{166}Pt			0.3 ms	α/	7.11/				
^{167}Pt			0.7 ms	α/	6.99/				
^{168}Pt		167.9880	2.0 ms	α	6.83				
^{169}Pt		168.9864	3. ms	α					
^{170}Pt		169.9816	15 ms	α	6.55				
^{171}Pt		170.9811	0.03 s	α					
^{172}Pt		171.97730	0.10 s	α /	6.31/94	0+			
^{173}Pt		172.9765	0.34 s	β^+ ,EC/8.2					
				α/	6.20/				
^{174}Pt		173.97281	0.89 s	β^+ ,EC/17 /5.6		0+			
				α/83 /	6.040/				
^{175}Pt		174.9723	2.5 s	β^+ ,EC/65 /7.6					0.0774
				α/35 /	5.831/5				0.1354
					5.96/54				0.2128
					6.038/				
^{176}Pt		175.9690	6.3 s	β^+ ,EC/60 /5.1		0+			ann.rad./
				α/40 /	5.528/0.6				0.2277
					5.750/41				
^{177}Pt		176.9685	11. s	EC/91 /6.8	5.53/				0.0908
				α/9 /	5.485/3				
					5.525/6				
^{178}Pt		177.9649	21. s	EC/93 /4.5		0+			
				α/7 /	5.286/0.2				
					5.442/7				
^{179}Pt		178.9653	33. s	β^+ ,EC/5.7					
				α /	5.16/				
^{180}Pt		179.9632	52. s	β^+ ,EC/99.7 /3.7			0+		
				α/0.3 /	5.140/				
^{181}Pt		180.9632	51. s	β^+ ,EC/5.2					
^{182}Pt		181.9613	2.7 m	β^+ ,EC/2.9		0+			ann.rad./
									0.1360
									0.1460
									0.2100
^{183m}Pt			43. s	β^+ ,EC/		(7/2-)			ann.rad./
				I.T./					0.3132
									0.3164
									0.6296

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{183}Pt		182.9617	7. m	β^+ ,EC/4.6					ann.rad./
^{184}Pt		183.9599	17.3 m	β^+ ,EC/2.3					ann.rad./ 0.1549 0.1919 0.5484
^{185m}Pt			33. m	β^+ ,EC/		1/2-			
^{185}Pt		184.9607	1.18 h	β^+ ,EC/3.8		(9/2+)			ann.rad./ 0.1353 0.1974 0.2296 0.2551
^{186}Pt		185.95943	2.0 h	β^+ ,EC/1.38		0+			ann.rad./ 0.6115 0.6892
^{187}Pt		186.9607	2.35 h	β^+ ,EC/3.1		3/2			ann.rad./ Ir k x-ray 0.1064 0.1100 0.2015 0.2849 0.7092
^{188}Pt		187.95940	10.2 d	EC/0.51		0+			Ir k x-ray 0.1876 0.1951
^{189}Pt		188.96083	10.9 h	β^+ ,EC/1.97		3/2-	0.43	-0.6	Ir k x-ray 0.0943 0.6076 0.7214 (0.09-1.47)
^{190}Pt	0.01(1)	189.95993	$4.5x10^{11}$ y			0+			
^{191}Pt		190.961684	2.96 d	EC/1.02		(3/2-)	0.50	-0.6	Ir k x-ray 0.3599 0.4094 0.5389
^{192}Pt	0.79(6)	191.961035				0+			
^{193m}Pt			4.33 d	I.T./0.1498		13/2+	-0.75		Pt k x-ray 0.1355
^{193}Pt		192.962984	60. y	EC/0.0566		(1/2-)			Ir k x-rays
^{194}Pt	32.9(6)	193.962663				0+			
^{195m}Pt			4.02 d	I.T./0.2952		13/2+	0.61	+1.4	Pt k x-ray 0.0989
^{195}Pt	33.8(6)	194.964774				1/2-	+0.6095		
^{196}Pt	25.3(6)	195.964934				0+			
^{197m}Pt			1.590 h	I.T./97 / β- /3 /		13/2+			Pt k x-ray 0.0530 0.3465
^{197}Pt		196.967323	18.3 h	β- /0.719		1/2-	0.51		Au k x-ray 0.1914 0.2688
^{198}Pt	7.2(2)	197.967875				0+			
^{199m}Pt			13.6 s	I.T./0.424		13/2+			Pt k x-ray 0.3919
^{199}Pt		198.970576	30.8 m	β- /1.70	0.90/18 1.14/14	(5/2-)			0.3170/4.9 0.49375/5.7 0.5430/14.8 (0.055-1.293)

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{200}Pt		199.97142	12.5 h	β- /≈0.66		0+			Au k x-ray
									0.13590
									0.22747
									0.24371
^{201}Pt		200.9745	2.5 m	β- /2.66		(5/2-)			0.070
									0.152
									0.222
									1.760
^{202}Pt		201.9757	1.8 d						0.440
$_{79}$Au		**196.96655(2)**							
^{171}Au		170.9918	1.0 ms	p/46	1.69				
				α/54	7.00				
^{172}Au		171.9901	4 ms	α/7.02	6.86				
^{173}Au		172.9864	0.06 s	α					
^{174}Au		173.9842	0.12 s	α					
^{175}Au		174.9817	0.20 s	α					
^{176}Au		175.9803	1.2 s	β^+ ,EC/10.5					
				α /	6.260/80				
					6.290/20				
^{177}Au		176.9772	1.2 s	α /	6.115/				
					6.150/				
^{178}Au		177.9760	2.6 s	α /	5.920/				
^{179}Au		178.9732	7.5 s	α /	5.85/				
^{180}Au		179.9724	8.1 s	EC/8.6	5.65				0.1522
				α/	5.61				0.2564
					5.50				0.5242
									0.6765
									0.8084
									0.8597
^{181}Au		180.9700	11.4 s	EC/97.5/6.3	5.482/				
				α/2.7/					
^{182}Au		181.9686	21. s	β^+ ,EC/6.9					ann.rad./
				α/0.13/					0.1549
									0.2649
									(0.13-1.4)
^{183}Au		182.9676	42. s	EC/5.5			+1.97		0.1630
				α/0.8/					0.2730
									0.3625
^{184m}Au			48 s			(2+)	+1.44	+1.9	0.069(IT)
^{184}Au		183.9675	21. s	EC,β^+ /7.1		(5+)	+2.07	+4.7	
				α/0.013/					
^{185m}Au			6.8 m	β^+ ,EC/					
				I.T./0.145					
^{185}Au		184.9657	4.3 m	β^+ ,EC/4.71		(5/2-)	+2.17	-1.1	ann.rad./
				α/0.26/					
^{186m}Au			< 2. m	β^+ ,EC/					0.1915
^{186}Au		185.9659	10.7 m	β^+ ,EC/6.0		3-	-1.26	+3.1	ann.rad./
				α/8(10)$^{-4}$/					0.1915
									0.2988
^{187m}Au			2.3 s	IT		9/2-			
^{187}Au		186.9646	8.3 m	β^+ ,EC/3.60		1/2+	+0.54		ann.rad./
									0.9152
									1.2668

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{188}Au		187.9651	8.8 m	β^+ ,EC/5.3		(1-)	-0.07		1.3321 1.4081 ann.rad./ 0.2660 0.3404 0.6061
^{189m}Au			4.6 m	β^+ ,EC/		11/2-	+6.19		0.1667
^{189}Au		188.9642	28.7 m	EC/96 /3.2 β^+ /4 /		1/2+	+0.49		ann.rad./ Pt k x-ray 0.4478 0.7133
^{190}Au		189.96470	43. m	β^+ /2 /4.44 EC/98 /		1-	-0.07		0.8128 ann.rad./ Pt k x-ray 0.2958 0.3018 0.5977
^{191m}Au			0.9 s	I.T./0.2663		(11/2-	6.6		Au k x-ray 0.2414 0.2526
^{191}Au		190.96365	3.2 h	EC/1.83		3/2+	+0.137	+0.72	Pt k x-ray 0.5864/16 (0.088-1.30)
^{192}Au		191.96481	4.9 h	β^+ /5 /3.52 EC/95 /	2.19/ 2.49/	1-	-0.011	-0.23	ann.rad./ Pt k x-ray 0.2959 0.3165
^{193m}Au			3.9 s	I.T./0.2901		11/2-	6.2	+1.98	Au k x-ray 0.2580
^{193}Au		192.96413	17.6 h	EC/1.07		3/2+	+0.140	+0.66	Pt k x-ray 0.1862 0.2556
^{194}Au		193.96534	1.64 d	β^+ /3 /2.49 EC/97 /	1.49/	1-	+0.075	-0.24	ann.rad./ Pt k x-ray 0.2935 0.3284/61
^{195m}Au			30.5 s	I.T./0.3186		11/2-	6.2	+1.9	Au k x-ray 0.2617
^{195}Au		194.965017	186.12 d	EC/0.227		3/2+	+0.149	+0.61	Pt k x-ray
^{196m2}Au			9.7 h	I.T./0.5954		12-	5.7		Au k x-ray 0.1478 0.1883
^{196m1}Au			8.1 s	I.T./0.0846		8+			0.0847
^{196}Au		195.966551	6.18 d	EC/92 /1.506		2-	+0.591	0.81	Pt k x-ray
^{197m}Au			7.8 s	I.T./0.4094 β- /8 /0.686		11/2-	+6.0	+1.7	Au k x-ray 0.1302 0.2790
^{197}Au	100.	196.966551				3/2+	+0.14575	+0.55	
^{198m}Au			2.30 d	I.T./0.812		(12-)			Au k x-ray 0.0972 0.1803 0.2419
^{198}Au		197.968225	2.694 d	β- /1.372	0.290/1 0.961/99	2-	+0.5934	+0.68	Hg k x-ray 0.411794
^{199}Au		198.968748	3.14 d	β- /0.453	0.25/22 0.292/72	3/2+	+0.2715	0.55	Hg k x-ray 0.15837

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{200m}Au			18.7 h	β- /84 /1.0 I.T./16 /	0.462/6 0.56/	12-	5.9		0.20820 Au k x-ray 0.2559/71 0.3680/77 0.4978/73 0.5793/72 0.084-0.904)
^{200}Au		199.97072	48.4 m	β- /2.24	0.7/15 2.2/77	1-			0.3679/19 1.2254/10.6 (0.077-1.570)
^{201}Au		200.97165	26. m	β- /1.28	1.27/82	3/2+			(0.027-0.732)
^{202}Au		201.9738	29. s	β- /3.0		(1-)			0.4396
^{203}Au		202.97515	1.0 m	β- /2.14	≈ 1.9/	3/2+			(0.04-0.37)
^{204}Au		203.9783	40. s	β- /4.5		(2-)			0.4366 1.5113
^{205}Au		204.9796	31. s	β- /					(0.38-1.33)
$_{80}$Hg		**200.59(2)**							
^{174}Hg			≈ 2.7 ms	α	7.07				
^{175}Hg		174.9912	0.02 s	α					
^{176}Hg		175.98733	0.03 s	α	6.77				
^{177}Hg		176.9863	0.13 s	α					
^{178}Hg		177.98248	0.26 s	EC/50 /6.1 α/50 /	6.43/	0+			
^{179}Hg		178.9818	1.09 s	EC/8.0 α /	6.29/				
^{180}Hg		179.9783	2.6 s	EC/5.5 α /	6.12/33 5.69/.03	0+			0.1250 0.3005 0.3812
^{181}Hg		180.9778	3.6 s	β^+ EC/74 /≈7.3 α/26 /		(1/2-)	+0.5071		0.0663 0.0811 0.0924 0.1474 0.1587 0.2142 0.2398
^{182}Hg		181.9739	10.8 s	β^+ ,EC/85 /5.0 α/15 /	5.87/8.6 5.45/0.03	0+			0.1289 0.2168 0.4126
^{183}Hg		182.9744	9. s	β^+ ,EC/77 /6.3 α /	5.83/ 5.91/	1/2-	+0.524		0.0714 0.0874 0.1538
^{184}Hg		183.9719	30.9 s	β^+ ,EC/99 /4.1 α/1 /	5.54/1.3 5.07/2 x 10^{-3}	0+			0.0915 0.1265 0.1560 0.2362
^{185m}Hg			21. s	β^+ ,EC,IT,α /	5.37/	13/2+	-1.02	+0.2	0.211 0.292
^{185}Hg		184.9720	51. s	β^+ ,EC/95 /5.8		1/2-	+0.509		(0.02-0.55)
^{186}Hg		185.9695	1.4 m	β^+ ,EC/3.3 α	5.09/0.02	0+			0.1119 0.2518
^{187m}Hg			1.7 m	β^+ ,EC/		13/2+	-1.04	+0.5	See Hg[187]
^{187}Hg		186.9698	2.4 m	β^+ ,EC/4.9		3/2-	-0.594		0.1034/32. 0.2334/100.

TABLE OF THE ISOTOPES

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									0.2403/33. 0.27151/31. 0.3763/38. 0.5254/30. (0.10-2.18)
^{188}Hg		187.9676	3.2 m	β^+ ,EC/2.3 α	4.61	0+			0.0988 0.1148 0.1424 0.1900
^{189m}Hg			8.6 m	EC/		13/2+	-1.06	+0.7	0.0780 0.3210 0.4345 0.5655 (0.08-2.170)
^{189}Hg		188.9687	7.6 m	EC/4.2		3/2-	-0.6086	-0.8	0.2005 0.2038 0.2386 0.2485
^{190}Hg		189.9663	20.0 m	EC/1.5		0+			0.1296 0.1426
^{191m}Hg			51. m	β^+ /6 / EC/94 /		13/2+	-1.07	+0.6	ann.rad./ Au k x-ray 0.2741 0.4203 0.5787 (0.07-1.9)
^{191}Hg		190.9671	50. m	β^+ ,EC/3.2		(3/2-)	-0.62	-0.8	0.1963 0.2247 0.2524
^{192}Hg		191.9653	5.0 h	EC/≈0.5		0+			Au k x-ray 0.1572 0.2748 0.3065
^{193m}Hg			11.8 h	β^+ ,EC/91 / I.T./9 /0.2901		13/2+	-1.05843	+0.92	Hg k x-ray 0.1866 0.2580 0.4076 0.5733 0.9324 (0.1-1.96)
^{193}Hg		192.96664	3.8 h	EC,B^+/2.34		3/2-	-0.6276		0.1866 0.2580 0.8611
^{194}Hg		193.96538	520. y	EC/0.04		0+			Au L x-rays
^{195m}Hg			1.67 d	I.T./(54)/0.3186 EC/(46)/		13/2+	-1.04465	+1.1	Hg k x-ray Au k x-ray 0.2617 0.5603 0.7798
^{195}Hg		194.96664	9.5 h	EC/1.51		1/2-	+0.541475		Au k x-ray 0.0614 0.7798
^{196}Hg	0.15(1)	195.965814				0+			
^{197m}Hg			23.8 h	I.T./(93)/0.2989		13/2+	-1.02768	+1.2	Hg k x-ray Au k x-ray 0.13398

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{197}Hg		196.967195	2.672 d	EC/0.600		1/2-	+0.527374		Au k x-ray 0.07735
^{198}Hg	9.97(8)	197.966752				0+			
^{199m}Hg			42.6 m	I.T./0.532		13/2+	-1.014703	+1.2	Hg k x-ray 0.15841
^{199}Hg	16.87(10)	198.968262				1/2-	+0.505885		
^{200}Hg	23.10(16)	199.968309				0+			
^{201}Hg	13.18(8)	200.970285				3/2-	-0.560226	+0.39	
^{202}Hg	29.86(20)	201.970625				0+			
^{203}Hg		202.972857	46.61 d	β- /0.492	0.213/100	5/2-	+0.8489	+0.34	Tl k x-ray 0.279188
^{204}Hg	6.87(4)	203.973475				0+			
^{205}Hg		204.976056	5.2 m	β- /1.531	1.33/4	1/2-	+0.6010		0.20378 (0.2-1.4)
^{206}Hg		205.97750	8.2 m	β- /1.31	0.935/34 1.3/63	0+			Tl k x-ray 0.3052 0.6502
^{207}Hg		206.9825	2.9 m	β- /4.8		(9/2+)			
^{208}Hg		207.9859	0.7 h	β-					0.474
$_{81}$Tl		**204.3833(2)**							
^{179}Tl		178.9917	0.2 s	α					
^{182}Tl		181.9856	3. s	β^+, EC/10.9					0.351 (0.26-0.41)
^{183m}Tl			0.06 s	α		9/2-			
^{183}Tl		182.9826	5. s	β^+, EC/7.7		1/2+			0.208
^{184}Tl		183.9818	11. s	β^+, EC/(98)/9.2 α/(2)/	 6.16/				0.2868 0.3399 0.3667
^{185m}Tl			1.8 s	I.T./0.453 α/5.97	 6.01/	(9/2-)			0.1688 0.2840
^{185}Tl		184.9791	20. s	EC/β^+/6.6					
^{186m}Tl			4. s	I.T./0.374					0.3738
^{186}Tl		185.9776	28. s	β^+ ,EC/7.5					0.3567 0.4026 0.4053
^{187m}Tl			15.6 s	I.T./≈ 0.33		(9/2+)	3.8	-2.4	0.2995
^{187}Tl		186.9762	50. s	β^+ ,EC/6.0		1/2+	1.6		
^{188m}Tl			1.18 m	β^+ ,EC/		(7+)			Hg k x-ray 0.4129 0.5043 0.5921
^{188}Tl		187.9759	1.2 m	β^+ ,EC/7.8		(2-)	0.48	0.13	See Tl[188m] 0.4129
^{189m}Tl			1.4 m	β^+ ,EC/		(9/2-)	+3.878	-2.29	0.2156 0.2284 0.3175 0.4452
^{189}Tl		188.9743	2.3 m	β^+ ,EC/5.2		(1/2+)			0.3337 0.4510 0.5223 0.9422
^{190m}Tl			3.7 m	β^+ ,EC/	4.2/	(7+)	+0.495	0.29	0.1968

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{190}Tl		189.9738	2.6 m	β^+ ,EC/7.0	5.7/	(2-)	+0.25	-0.33	0.4164 0.7311 0.4164 0.6254 0.6838 1.0999
^{191m}Tl			5.2 m	β^+ ,EC/(98)/		(9/2+)	+3.903	-2.3	0.2157 0.2647 0.3256 0.3359
^{191}Tl		190.9723				(1/2)	1.59		
^{192m}Tl			10.8 m	β^+ ,EC/		(7+)	+0.518	0.46	0.1740 0.4228 0.6348 0.7863
^{192}Tl		191.972	9.6 m	β^+ ,EC/6.4		(2-)	+0.20	-0.33	0.7455 0.3975 0.4228 0.6908
^{193m}Tl			2.1 m	I.T./(75)/		(9/2-)	+3.948	-2.2	0.3650
^{193}Tl		192.9706	22. m	β^+ ,EC/3.6		(1/2+)	+1.591		0.2077 0.3244 0.3440 0.6761 1.0447 1.5793
^{194m}Tl			32.8 m	β^+ /(20)/≈ 0.30 EC/(80)/		(7+)	+0.540	0.62	ann.rad./ Hg k x-ray
^{194}Tl		193.9711	34. m	β^+ ,EC/5.3		2-	0.14	-0.28	0.4282 0.6363 0.7490 0.3955 0.4282 0.6363
^{195m}Tl			3.6 s	I.T./0.483		9/2-			Tl k x-ray
^{195}Tl		194.9697	1.16 h	EC/(97)/2.8 β^+ /(3)/		1/2+	+1.58		0.0990 0.3836 ann.rad./ Hg k x-ray 0.2422 0.5635 0.8845 1.3639 (0.13-2.5)
^{196m}Tl			1.41 h	β^+ ,EC/(95)/4.9		(7+)	0.55	+0.76	0.0840 0.4261 0.6353 0.6954 (0.08-1.0)
^{196}Tl		195.9705	1.84 h	β^+ /(15)/4.4 EC/(85)/		2-	0.07	-0.18	ann.rad./ Hg k x-ray 0.4257 0.6105 (0.03-2.4)
^{197m}Tl			0.54 s	I.T./(53)/0.608		9/2-			Tl k x-ray

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
				β^+ ,EC/(47)/					0.2262 0.4118 0.5872 0.6367
^{197}Tl		196.96954	2.83 h	β^+ /(1)/2.18 EC/(99)/		1/2+	+1.58		Hg k x-ray 0.1522/8.2 0.4258
^{198m}Tl			1.87 h	β^+ ,EC/(53)/ I.T./(47)/0.5347		7+	+0.64		Hg k x-ray Tl k x-ray 0.4118 0.5872 0.6367
^{198}Tl		197.9405	5.3 h	EC,β^+ /(1)/3.5	1.4/ 2.1/ 2.4/	2-	0.00(1)		Hg k x-ray 0.4118 0.6367 0.6759 (0.23-2.8)
^{199}Tl		198.9698	7.4 h	EC/1.4		1/2-	+1.60		Hg k x-ray 0.2082 0.2473 0.4555
^{200}Tl		199.97095	1.087 d	EC/2.46	1.07/ 1.44/	2-	0.04		Hg k x-ray 0.36799 1.2057 (0.11-2.3)
^{201}Tl		200.97080	3.040 d	EC/0.48		1/2+	+1.605		Hg k x-ray 0.13528 0.16740/10.0
^{202}Tl		201.97209	12.23 d	EC/1.36		2-	0.06		Hg k x-ray 0.43957
^{203}Tl	29.524(14)	202.972329				1/2+	+1.622258		
^{204}Tl		203.973848	3.78 y	β- /(97)/0.7637 EC/(3)/0.347	0.763/97	2-	0.09		Hg k x-ray
^{205}Tl	70.476(14)	204.974412				1/2+	+1.638215		
^{206m}Tl			3.76 m	I.T./2.644		12-			Tl k x-ray 0.2166 0.2661 0.4534 0.6866 1.0219
^{206}Tl		205.976095	4.20 m	β- /1.533	1.53/99.9	0-			Pb k x-ray 0.80313
^{207m}Tl			1.3 s	I.T./1.350		11/2-			Tl k x-ray 0.3501 1.0000
^{207}Tl		206.97741	4.77 m	β- /1.423	1.43/99.8	1/2+	+1.88		0.89723
^{208}Tl		207.982004	3.053 m	β- /5.001	1.28/23 1.52/22 1.796/51	(5+)	+0.29		Pb k x-ray 0.27728 0.51061 0.58302 2.61448
^{209}Tl		208.98535	2.16 m	β- /3.98	1.8 /100	(1/2+)			Pb k x-ray 1.5670/100 0.4651/95 (0.12-1.33)
^{210}Tl		209.99006	1.30 m	β- /5.48	1.3/25	(5+)			Pb k x-ray

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
					1.9/56				0.081 0.2981 0.79788
$_{82}$Pb		**207.2(1)**							
^{180}Pb			5 ms	α/	7.23				
^{181}Pb		180.9967	0.05 s	α/	7.07				
^{182}Pb		181.99268	0.06 s	α	6.92				
^{183}Pb		182.9919	0.3 s	α/		1/2+			
^{184}Pb		183.9882	0.6 s	α/	6.63/	0+			
^{185}Pb		184.9876	4.1 s	α/	6.34/ 6.40/ 6.48/				
^{186}Pb		185.9835	5. s	β^+,EC/(95)/5.5 α/(5)/	6.32/ 6.34/<100 6.01/<0.2	0+			
^{187m}Pb			15.2 s	β^+,EC/	5.99/ 6.19/	(1/2-)			0.0674 0.2080 0.2755 0.2995 0.4487 0.7477
^{187}Pb		186.9839	18.3 s	EC/7.2 α/	6.08/	13/2+			0.1930 0.3314 0.3435 0.3934
^{188}Pb		187.9811	23. s	EC/(78)/4.8 α/(22)/	5.98/<10 5.61/<0.1	0+			0.1850 0.7582
^{189}Pb		188.9809	51. s	EC/6.1 α/	5.58/				
^{190}Pb		189.9782	1.2 m	β^+ (13)/4.1 EC/(86)/ α/(0.9)/	5.58/	0+			ann.rad./ Tl k x-ray 0.1415 0.1512 0.9422
^{191m}Pb			2.2 m	β^+,EC/		13/2+			ann.rad./ 0.3871 0.6135 0.7122
^{191}Pb		190.9782	1.3 m	β^+,EC/5.5					ann.rad./ 0.9368
^{192}Pb		191.9758	3.5 m	β^+,EC/≈3.4 α/.006/	5.11	0+			ann.rad./ 0.1675 0.6082 1.1954
^{193m}Pb			5.8 m	β^+,EC/		13/2+	-1.16		ann.rad./ 0.3650 0.3922
^{193}Pb		192.9761	≈ 2. m	EC/5.2		3/2			
^{194}Pb		193.9740	11. m	β^+,EC/2.7 α	4.64	0+			ann.rad./ 0.2036
^{195m}Pb			15. m	β^+ /(8)/		13/2+	-1.132	+0.29	ann.rad./

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
				EC/(92)/					Tl k x-ray 0.3836 0.3942 0.8784
^{195}Pb		194.976	≈ 15. m	β^+,EC/5.8					ann.rad./ 0.3836 0.3937 0.7776
^{196}Pb		195.9727	37. m	β^+ ,EC/2.1		0+			Tl k x-ray 0.2531 0.5021
^{197m}Pb			43. m	EC/(79)/ β^+ /(2)/ I.T./(19)/0.3193		13/2+	-1.105	+0.5	Tl k x-ray 0.3079 0.3877 0.7743 (0.2-2.2)
^{197}Pb		196.9734	≈ 8. m	EC/(97)/3.6 β^+ /(3)/		(3/2-)	-1.075	-0.08	Tl k x-ray 0.3755 0.3858 0.7611
^{198}Pb		197.9720	2.4 h	EC/1.4		0+			Tl k x-ray 0.1734 0.2903 0.3654
^{199m}Pb			12.2 m	I.T./(93)/0.4248 β^+ ,EC/(7)/		13/2+	-1.074	+0.08	Pb k x-ray 0.4255
^{199}Pb		198.9729	1.5 h	EC/(99)/2.9 β^+ /(1)/		5/2-			Tl k x-ray 0.3534 0.7202 1.1350 (0.22-2.4)
^{200}Pb		199.97182	21.5 h	EC/0.81		0+			Tl k x-ray 0.14763
^{201m}Pb			1.02 m	I.T./0.6291		13/2+			Pb k x-ray 0.6288
^{201}Pb		200.97285	9.33 h	EC/1.90		5/2-	+0.675	-0.009	Tl k x-ray 0.33120 0.36131 (0.11-1.8)
^{202m}Pb			3.53 h	I.T./(90)/2.170 β^+ /(10)/		9-	-0.228	+0.58	Pb k x-ray Tl k x-ray 0.42219 0.78700 0.96271
^{202}Pb		201.97214	5.3×10^4 y	EC/0.05		0+			Tl L x-ray
^{203m}Pb			6.2 s	I.T./0.8252		13/2+			Pb k x-ray 0.8203 0.8252
^{203}Pb		202.97338	2.1615 d	EC/0.98		5/2-	+0.686	+0.10	Tl k x-ray 0.279188
^{204m}Pb			1.12 h	I.T./2.185		9-			Pb k x-ray 0.37481 0.89922 0.91175
^{204}Pb	1.4(1)	203.973028				0+			
^{205}Pb		204.974467	1.51×10^7 y	EC/0.0512		5/2-	+0.712	+0.23	Tl L x-ray

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{206}Pb	24.1(1)	205.974449				0+			
^{207m}Pb			0.80 s	I.T./1.632		13/2+			Pb k x-ray 0.56915 1.06310
^{207}Pb	22.1(1)	206.975880				1/2-	+0.59258		
^{208}Pb	52.4(1)	207.976636	>2x10^{19} y	SF		0+			
^{209}Pb		208.981075	3.25 h	β- /0.644	0.645/100	9/2+	-1.474	-0.3	
^{210}Pb		209.984174	22.6 y	β- /0.0635	0.017/81 0.061/19	0+			
				α	3.72				
^{211}Pb		210.988732	36.1 m	β- /1.37	0.57/5 1.36/92	(9/2+)	-1.404	+0.09	0.40486 0.42700 0.83186 (0.09-1.27)
^{212}Pb		211.991887	10.64 h	β- /0.574	0.28/83 0.57/12	0+			Bi k x-ray 0.23858
^{213}Pb		212.9966	10.2 m	β- /2.1					
^{214}Pb		213.999797	26.9 m	β- /1.0	0.67/48 0.73/42	0+			Bi k x-ray 0.24192 0.29509 0.35187
^{215}Pb			36 s						
$_{83}$Bi		**208.98038(2)**							
^{185}Bi		184.9977	0.04 ms	p/86 α/14	1.59				
^{186}Bi		185.9965	10 ms	α	7.16 7.26				
^{187m}Bi			$\approx$ 8. ms	α					
^{187}Bi		186.9935	35. ms	α					
^{188}Bi		187.9922		α					
^{189m}Bi			7.0 ms	α	7.30				
^{189}Bi		188.9895	0.68 s	α					
^{190}Bi		189.9875	5. s	β^+,EC/(10)/8.7 α/(90)/	6.45/				
^{191}Bi		190.9861	12. s	β^+,EC/(60)/7.3 α/(40)/	6.32/				
^{192}Bi		191.9854	40. s	β^+,EC/(80)/9.0 α/(20)/	6.06/				
^{193m}Bi			3.2 s	β^+,EC/ α/	6.48/	1/2+			
^{193}Bi		192.9837	1.11 m	β^+,EC/(40)/7.1 α/(60)/	5.91/	9/2+			
^{194}Bi		193.9828	1.8 m	β^+,EC/(99.9)/8.2 α/0.1/			(10-)		0.1661 0.1740 0.2802 0.421 0.5754 0.9650
^{195m}Bi			1.45 m	β^+,EC/(94)/ α/(6)/	6.11/				
^{195}Bi		194.9811	2.9 m	β^+,EC/(99.8)/5.8 α/(0.2)	5.45/		3/2-		
^{196}Bi		195.9806	5. m	EC/$\approx$7.4					0.1376

TABLE OF THE ISOTOPES

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									0.3720 0.6880 1.0486
^{197}Bi		196.9789	5. m	β^+ ,EC/5.2		1/2+			
^{198m}Bi			7.7 s	I.T./0.2485		(10-)			0.2485
^{198}Bi		197.9790	11.8 m	β^+ ,EC/6.6		(7+)			0.0900 0.1976 0.5624 1.0635
^{199m}Bi			24.7 m	β^+ ,EC/					ann.rad./
^{199}Bi		198.9776	27. m	β^+ ,EC/4.3		9/2-			0.7203 0.8374 0.8417 0.9460 1.0528 1.3056 (0.12-3.2)
^{200m}Bi			31. m	β^+ ,EC/		(2+)			0.2453 0.4198 0.4624 1.0265
^{200}Bi		199.9781	36. m	EC/(90)/5.9 β^+ /(10)/		7+			ann.rad./ Pb k x-ray 0.4198 0.4623 1.0265
^{201m}Bi			59.1 m	I.T./0.846 β^+ ,EC/		(1/2+)			Bi k x-ray 0.8464
^{201}Bi		200.97697	1.8 h	EC/3.84		9/2-			Pb k x-ray 0.6288 0.9357 1.0138 (0.13-2.4)
^{202}Bi		201.97768	1.72 h	β^+ /(3)/5.16 EC/(97)/		5+	+4.26	-0.72	ann.rad./ Pb k x-ray 0.57860 0.92734 (0.08-3.5)
^{203}Bi		202.97687	11.8 h	EC/(99.8)/3.25 β^+ /(0.2)/	1.35/	9/2-	+4.02	-0.69	Pb k x-ray 0.1865 0.8203 0.8969 1.8475 (0.1-2.9)
^{204}Bi		203.97779	11.2 h	EC/4.44		6+	+4.32	-0.43	Pb k x-ray 0.37481 0.89922 0.98409
^{205}Bi		204.97737	15.31 d	EC/2.71		9/2-	+4.07	-0.59	Pb k x-ray 0.70347 1.76435
^{206}Bi		205.97848	6.243 d	EC/3.76		6+	+4.36	-0.39	Pb k x-ray 0.51619 0.80313 0.88100
^{207}Bi		206.978456	35. y	EC/2.399		9/2-	4.08	-0.6	Pb k x-ray

TABLE OF THE ISOTOPES

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									0.56915
									1.06310
^{208}Bi		207.979727	3.68×10^{5} y	EC/2.880		5+			Pb k x-ray
									2.61435
^{209}Bi	100.	208.980384				9/2-	+4.111	-0.37	
^{210m}Bi			3.0×10^{6} y	α/	4.420(3)/0.29	9-	+2.73	-0.47	Tl k x-ray
					4.569(3)/3.9				0.2661
					4.584(3)/1.4				0.3052
					4.908(4)/39				0.6502
					4.946(3)/55				
^{210}Bi		209.984105	5.01 d	β- /1.163	1.16/99	1-	-0.0445	+0.136	0.2661
									0.3.52
^{211}Bi		210.98726	2.14 m	α/(99.7)/	6.279/16	9/2-			Tl k x-ray
				β- /(0.3)/0.58	6.623/84				0.3501
^{212m2}Bi			7. m	β- /		(15-)			
^{212m1}Bi			25.0 m	α/(93)/	6.300/40	(9-)			0.120
				β- /(7)/	6.340/53				0.233
									0.275
									0.404
									0.727
^{212}Bi		211.991271	1.009 h	β- /(64)/2.254		(1-)	+0.32	+0.1	Tl k x-ray
				α/(36)/	6.051/25				Po k x-ray
					6.090/9.6				0.2881
									0.72725
									0.78551
									1.62066
^{213}Bi		212.99437	45.6 m	β- /(98)/1.43	1.02/31	9/2-	+3.72	-0.60	Po k x-ray
				α/(2)/	1.42/66				0.4404
					5.549/0.16				(0.15-1.328)
					5.869/2.0				
									1.10006
^{214}Bi		213.99870	19.7 m	β- /3.27					0.60931
									1.12027
									1.76449
									(0.19-3.2)
^{215}Bi		215.0018	7.7 m	β- /2.3					0.2937
									(0.27-0.835)
^{216}Bi		216.0062	3.6 m	β-/4.0					0.5498
									0.4192
^{217}Bi			97 s	β/					
^{84}Po									
^{190}Po		189.9951	2.4 ms	α/	7.53				
^{191}Po		190.9947	17 ms	α/	7.33				
^{192}Po		191.9915	34. ms	α/8.5	7.17				
^{193m}Po			0.24 s	α/	7.00				
^{193}Po		192.9911	0.45 s	α/	6.95				
^{194}Po		193.9883	0.39 s	α/	6.84/93	0+			
					6.19/0.22				
^{195m}Po			1.9 s	α/	6.70/				
^{195}Po		194.9881	4.6 s	α/	6.61/				
^{196}Po		195.9855	5.8 s	α/(95)/	6.52/94	0+			
				β^{+},EC/(5)/≈4.6	5.77/0.02				
^{197m}Po			25.8 s	α/(84)/	6.385(3)/55	13/2+			

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^{197}Po		196.9856	53. s	β^+,EC/(16)/ α/(44)/	6.282(4)/76	(3/2-)			
^{198}Po		197.9834	1.76 m	β^+,EC/(56)/6.2 α/(70)/	6.18/57	0+			
^{199m}Po			4.2 m	β^+,EC/(30)/4.0 β^+,EC/(51)/ α/(39)/	5.27/7.6 x 10^{-4} 6.059/24	13/2+	0.99		ann.rad./ 0.2745 0.4998 1.0020
^{199}Po		198.985	5.2 m	β^+,EC/(88)/7. α/(12)/	5.952/7.5	(3/2-)			Bi k x-ray 0.1877 0.3616 1.0214 1.0344
^{200}Po		199.9817	11.5 m	β^+,EC/(85)/3.4 α/(15)/	5.863/11.1	0+			0.14748 0.32792 0.6176 0.6709
^{201m}Po			8.9 m	β^+,EC/(57)/ I.T./(40)/0.418 α/(3)/	5.786/≈3.	13/2+	1.0		Bi k x-ray Po k x-ray 0.2726 0.4123 0.4179 0.9670
^{201}Po		200.9822	15.3 m	β^+,EC/(98)/4.9 α/(2)/	5.683(3)/1.1	3/2-	0.94		Bi k x-ray 0.2056 0.2250 0.8483 0.9048
^{202}Po		201.9807	45. m	β^+,EC/(98)/2.8 α/(2)/	5.588/1.9	0+			0.0410 0.1656 0.3158 0.6884
^{203m}Po			1.2 m	I.T./(96)/0.6414 β- EC/(4)/			13/2+		Bi k x-ray Po k x-ray 0.6414
^{203}Po		202.9814	35. m	β^+,EC/4.2		5/2-	+0.74		0.17516 0.21477 0.89350 0.90863 1.09095
^{204}Po		203.98031	3.53 h	EC/2.34 α	5.377/0.66	0+			Bi k x-ray 0.2702 0.8844 1.0162 (0.11-1.9)
^{205}Po		204.98117	1.7 h	β^+,EC/3.53		5/2-	+0.76	+0.17	Bi k x-ray 0.83681 0.84983 0.87241 1.00124 (0.12-2.7)
^{206}Po		205.98047	8.8 d	EC/(95)/1.85 α/(5)/	5.223/5.5	0+			Bi k x-ray 0.28644 0.31156

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.51134
									0.80737
									1.03228
									(0.11-1.5)
^{207m}Po			2.8 s	I.T./1.383		19/2-			Po k x-ray
									0.2682
									0.30074
									0.81448
^{207}Po		206.98158	5.80 h	EC,β^+ /2.91		5/2-	+0.79	+0.28	Bi k x-ray
									0.74263
									0.91176
									0.99225
^{208}Po		207.981231	2.898 y	α/5.213	4.233/0.0002	0+			
					5.1158/100				
^{209}Po		208.982415	102. y	α/4.976	4.624/0.56	1/2-	+0.77		0.26049
					4.879/99.2				0.8964
^{210}Po		209.982857	138.38 d	α/5.407	4.516/0.001	0+			0.80313
					5.304/100				
^{211m}Po			25.2 s	α/	7.273/91	25/2+			Pb k x-ray
					7.994/1.7				0.32808
					8.316/0.25				0.56915
					8.875/7.0				0.89723
									1.06310
^{211}Po		210.986637	0.516 s	α/7.594	6.570/0.54	9/2+			0.56915
					6.892/0.55				0.89723
					7.450/98.9				
^{212m}Po			45. s	α/	8.514/2.0	16+			
					9.086/1.0				
					11.650/97				
^{212}Po		211.988852	0.298 μs	α/8.953	8.784/100	0+			
^{213}Po		212.992843	4. μs	α/8.537	7.614/0.003	9/2+			
					8.375/100				
^{214}Po		213.995186	163.7 μs	α/7.833	6.904/0.01	0+			0.7995
					7.686/99.99				0.298
^{215}Po		214.999415	1.780 ms	α/7.526	6.950/0.02	(9/2+)			
					6.957/0.03				
					7.386/100				
^{216}Po		216.001905	0.145 s	α/6.906	5.895/0.002	0+			
					6.778/99.99				
^{217}Po		217.0064	< 10. s	α/6.662	6.539/				
^{218}Po		218.008965	3.04 m	α/6.114	5.181/1.00	0+			
$_{85}$At									
^{193}At		192.9998	40 ms	α/					
^{194}At		193.9990	40 ms	α/					
^{195}At		194.9965	140 ms	α/					
^{196}At		195.9957	0.3 s	α/	7.05/				
^{197m}At			4. s	α		(1/2+)			
^{197}At		196.9939	0.35 s	β^+ ,EC/7.8		(9/2-)			
				α/	6.96/				
^{198m}At			1.5 s	β^+ ,EC/(75)/					
				α/(25)/	6.85/86				
^{198}At		197.9928	5. s	α/	6.75/94				
^{199}At		198.9910	7.1 s	β^+ ,EC/(8)/5.6		9/2-			

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{200m}At			4.3 s	α/(92)/ β^+,EC/(80)	6.64/	10-			
^{200}At		199.990	43. s	α/(20)/ β^+,EC/(65)/≈8.0	6.536/12		5+		
^{201}At		200.9885	1.48 s	α/(35)/ β^+,EC/(29)/5.9	6.412/44 6.465/57	9/2-			
^{202m}At			≤ 1.5 s	α/(71)/6.474 I.T./0.391	6.344/				
^{202}At		201.9885	3.02 m	β^+,EC/(88)/7.2 α/(12)/	6.135/7.7 6.225/4.3	5+			ann.rad./ 0.4413 0.5697 0.6753
^{203}At		202.9868	7.4 m	β^+,EC/(69)/5.1 α/(31)/6.210	6.088/	9/2-			0.1458 0.2459 0.6414 1.0020 1.0340
^{204}At		203.9873	9.1 m	β^+,EC/(95)/6.5 α/(5)/	5.951/	(5+)			Po k x-ray 0.3271 0.4254 0.5156 0.6837
^{205}At		204.98604	26. m	β^+,EC/(90)/4.54 α/(10)/6.020	5.902/		(9/2-)		Po k x-ray 0.1543 0.6696 0.7194
^{206}At		205.98660	29.4 m	β^+,EC/(99)/5.72 α/(1)/5.881	5.703/		5+		Po k x-ray 0.20186 0.39561 0.47716 0.70071
^{207}At		206.98578	1.81 h	β^+,EC/(90)/3.91 α/(10)/5.873	5.758/		9/2-		Po k x-ray 0.16801 0.58842 0.81448
^{208}At		207.98657	1.63 h	β^+,EC/(99)/4.97 α/(1)/5.752	5.626/0.01 5.641/0.53		(6+)		Po k x-ray 0.1770 0.2060 0.6601 0.6852 0.8450 1.0281
^{209}At		208.98616	5.4 h	β^+,EC/(96)/3.49 α/(4)/5.757	5.647/4.1		(6+)		Po k x-ray 0.10422 0.54503 0.78189 0.79020 (0.1-2.6)
^{210}At		209.98713	8.1 h	EC/99.8/3.98 α/(0.2)/5.632	5.361/0.05 5.442/0.05	5+			Po k x-ray 0.24535 0.52758 1.18143 1.43678 1.48335

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									(0.04-2.4)
^{211}At		210.987481	7.21 h	EC/(58)/0.787		9/2-			Po k x-ray
				α/(42)/5.980	5.211/0.004				0.66956
					5.868/42				0.6870
									0.74263
^{212m}At			0.119 s	α/	7.837/65	(9-)			
					7.897/33				
^{212}At		211.990735	0.314 s	α/7.828	7.058/0.4	(1-)			
					7.088/0.6				
					7.618/15				
					7.681/84				
^{213}At		212.992922	0.11 μs	α/9.254	9.080/	9/2-			
^{214m}At			0.76 μs	α/8.762		(9-)			
^{214}At		213.996357	0.56 μs	α/8.987	8.819/100	(1-)			
^{215}At		214.99864	0.10 ms	α/8.178	7.626/0.045	(9/2-)			0.40486
					8.023/99.9				
^{216}At		216.002408	0.30 ms	α/7.947	7.595/0.2	(1-)			
					7.697/2.1				
					7.800/97				
^{217}At		217.00471	32. ms	α/7.202	6.812/0.06	(9/2-)			0.2595
					7.067/99.9				0.3345
									0.5940
^{218}At		218.00868	1.6 s	α/6.883	6.654/6				
					6.695/90				
					6.748/4				
^{219}At		219.0113	50. s	α/6.390	6.275/				
^{220}At		220.0153	3.71 m	β- /3.7					(0.24-0.70)
^{221}At		221.0181	2.3 m	β					
^{222}At		222.0223	0.9 m	β					
^{223}At		223.0253	50. s	β					
$_{86}$Rn									
^{196}Rn		195.9977	≈ 3 ms	α/	7.49				
^{197m}Rn			0.02 s	α	7.36				
^{197}Rn		196.9983	0.07 s	α/	7.26				
^{198}Rn		197.9988	0.05 s	α					
^{199m}Rn			0.3 s	α		(13/2+)			
^{199}Rn		198.9983	0.62 s	α/		3/2-			
^{200}Rn		199.9957	1.06 s	α/(98)/	6.901/	0+			0.4329
				EC/(2)/5.					0.5043
^{201m}Rn			3.8 s	EC/(10)/		13/2+			
				α/(90)/	6.773/				
^{201}Rn		200.9955	7.0 s	α/(80)/	6.725/	(3/2-)			
				EC/(20)/	α/6.778				
^{202}Rn		201.9932	9.9 s	α/(12)/	6.641/	0+			0.5695
				EC/(88)/					(0.2876-0.6255)
^{203m}Rn			28. s	α/	6.551	13/2+	-0.96	+1.3	
^{203}Rn		202.9948	45. s	α/(66)/6.629	6.499/	0			
				EC/(34)/≈7.4					
^{204}Rn		203.9914	1.24 m	α/(68)/	6.420/	0+			
				EC/(32)/3.8					
^{205}Rn		204.9917	2.8 m	α/(23)/6.390	6.123(3)/0.02	(5/2-)	+0.80	+0.06	0.2652
				EC/(77)/5.2	6.262(3)/23				0.3553
									0.4648

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.6205 0.6753 0.7300
^{206}Rn		205.9902	5.7 m	α/(68)/6.384 EC/(32)/3.3	6.258(3)/	0+			0.06170 0.0968 0.3245 0.3862 0.4822 0.4973 0.7728
^{207}Rn		206.9907	9.3 m	β^+,EC/(77)/4.6 α/(23)/6.252	5.995(4)/0.02 6.068(3)/0.15 6.126(3)/22.8	5/2-	+0.82	+0.22	At k x-ray 0.32947 0.34455 0.36767 0.40267 0.74723 (0.18-1.4)
^{208}Rn		207.98963	24.3 m	α/(60)/6.260 EC/(40)/2.85	5.469(2)/0.003 6.140(2)/60	0+			
^{209}Rn		208.99038	29. m	β^+/(83)/3.93 α/(17)/	2.16/2.3 5.887(3)/0.04 5.898(3)/0.02 6.039(2)/16.9	5/2-	+0.8388	+0.31	At k x-ray 0.27933 0.33753 0.40841 0.68942 0.74594 (0.18-3.2)
^{210}Rn		209.98968	2.4 h	α/(96)/6.157 EC/(4)/2.37	5.351(2)/0.005 6.039(2)/96	0+			At k x-ray 0.19625 0.45824 0.57104 0.64868 (0.14-1.7)
^{211}Rn		210.99059	14.6 h	β^+,EC/(74)/2.89 α/(26)/5.964	5.619(1)/0.7 5.784(1)/16.4 5.851(1)/8.8		1/2-	+0.60	At k x-ray 0.16877 0.25022 0.37049 0.67412 0.67839 1.36298 (0.11-2.7)
^{212}Rn		211.990689	24. m	α/6.385	5.587(4)/0.05 6.260(4)/99.95	0+			
^{213}Rn		212.99387	25.0 ms	α/8.243	7.552(8)/1.0 8.087(8)/99	9/2+			
^{214}Rn		213.99535	0.27 μs	α/9.209	9.037(9)/	0+			
^{215}Rn		214.99873	2.3 μs	α/8.840	8.674(8)/	(9/2+)			
^{216}Rn		216.00026	45. μs	α					
^{217}Rn		217.003915	0.6 ms	α/7.885	7.500/0.1 7.742(4)/100	9/2+			
^{218}Rn		218.005586	35. ms	α/7.267	6.534(1)/0.16 7.133(1)/99.8	0+			0.6093 0.6653
^{219}Rn		219.009475	3.96 s	α/6.946(1)	6.3130(5)/0.05 6.425(3)/7.5 6.5309(4)/0.12 6.5531(3)/12.2	(5/2+)	-0.44	+0.93	Po k x-ray 0.13057 0.27113 0.40170

TABLE OF THE ISOTOPES

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					6.8193(3)/81				(0.1-1.05)
^{220}Rn		220.011384	55.6 s	α/6.404	5.7486(5)/0.07	0+			
					6.2883(1)/99.9				
^{221}Rn		221.0156	25. m	α/(22)/6.148	5.778(3)/1.8	7/2+	-0.020	-0.38	Fr L x-ray
				β- /(78)/1.2	5.788(3)/2.2				0.07384
					6.037(3)/18				0.08323
									0.0610
									0.18639
^{222}Rn		222.017570	3.8235 d	α/5.590	4.987(1)/0.08	0+			0.510
					5.4897(3)/99.9				
^{223}Rn		223.0218	23. m	β- /					
^{224}Rn		224.0241	1.8 h	β- /		0+			0.1085
									0.2601
									0.2655
^{225}Rn		225.0284	4.5 m	β- /		7/2	-0.70	+0.84	
^{226}Rn		226.0309	7.4 m	β- /					
^{227}Rn		227.0354	2. s	β- /					
^{228}Rn		228.0381	65. s	β- /					
$_{87}$Fr									
^{200}Fr		200.0065	$\approx$ 20 ms	α	7.47				
^{201}Fr		201.0046	0.05 s	α/	7.36/	(9/2-)			
^{202}Fr		202.0033	0.34 s	α/7.590	7.237(8)/100				
^{203}Fr		203.0014	0.55 s	α/7.280	7.132(5)/	(9/2-)			
^{204}Fr		204.001	2.1 s	α/	7.03/96				
					6.97/90				
					7.01/74				
^{205}Fr		204.9987	3.9 s	α/7.050	6.914(5)/	(9/2-)			
^{206m}Fr			0.7 s	α/	6.93				0.531(IT)
^{206}Fr		205.9985	16.0 s	α/7.416	6.792(5)/84				
^{207}Fr		206.9969	14.8 s	α/6.900	6.766(5)/	9/2-	+3.9	-0.16	
^{208}Fr		207.99713	59.1 s	α/(77)/6.770	6.636(5)/	7+	-4.8	+0.004	
				EC/(23)/6.99					
^{209}Fr		208.99592	50.0 s	α/(89)/5.1	6.646(3)/	9/2-	+3.9	-0.24	0.7978
				EC/(11)/5.16					(0.1103-1.384)
^{210}Fr		209.99640	3.2 m	α/6.670	6.543(5)/	6+	+4.4	+0.19	0.2030
				EC/6.26					0.6438
									0.8175
									0.9008
^{211}Fr		210.99553	3.10 m	α/6.660	6.534(5)/	9/2-	+4.0	-0.19	0.220
				EC/4.61					0.2799
									0.5389
									0.9169
^{212}Fr		211.99618	20. m	EC/(57)/5.12	6.261(1)/16	(5+)	+4.6	-0.10	Rn x-ray
				α/(43)/6.529	6.335(1)/4				0.08107
					6.335(1)/4				0.08378
					6.343(1)/1.3				0.2277
					6.383(1)/10				1.1856
					6.406(1)/9.5				1.2748
					6.08-6.18				0.014-1.178
^{213}Fr		212.99617	34.6 s	α/6.905	8.476(4)/51	9/2-	+4.0	-0.14	
^{214m}Fr			3.4 ms	α/	8.547(4)/46	9-			
					6.775-8.046				
^{214}Fr		213.99895	5.1 ms	α/8.587	7.409(3)/0.3	(1-)			

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					7.605(8)/1.0 7.940(3)/1.0 8.355(3)/4.7 8.427(3)/93				
^{215}Fr		215.00033	0.12 μs	α/9.537	9.360(8)/	(9/2-)			
^{216}Fr		216.00319	0.70 μs	α/9.175	9.005(10)/95				(0.045-0.160)
^{217}Fr		217.00462	0.016 ms	α/8.471	8.315(8)/	(9/2-)			
^{218m}Fr			22. ms	α					
^{218}Fr		218.00756	1. ms	α/8.014	7.384(10)/0.5 7.542(15)/1.0 7.572(10)/5 7.732(10)/0.5 7.867(2)/93	(1-)			
^{219}Fr		219.00924	21. ms	α/8.132	6.802(2)/0.25 6.967(2)/0.6 7.146(2)/0.25 7.313(2)/99	(9/2-)			
^{220}Fr		220.012313	27.4 s	α/6.800	6.582(1)/10 6.630(2)/6 6.641(1)/12 6.686(1)/61 6.39-6.58	1+	-0.67	+0.47	0.0450 0.061 0.1060 0.1539 0.1617
^{221}Fr		221.01425	4.8 m	α/6.457	5.9393(7)/0.17 5.9797(7)/0.49 6.0751(7)/0.15 6.1270(7)/ 6.2433(3)/1.3 6.3410(7)/83.4	(5/2-)	+1.58	-1.0	At k x-ray 0.0995 0.21798 0.4091
^{222}Fr		222.01754	14.3 m	β- /2.03 α/5.850	1.78/	2-	+0.63	+0.51	
^{223}Fr		223.019731	22.0 m	β- /1.149	1.17/65	(3/2+)	+1.17	+1.17	0.05014 0.07972 (0.13-0.9)
^{224}Fr		224.02323	3.0 m	β- /2.82		1-	+0.40	+0.517	0.13150 0.21575 0.8367 (0.1-2.21)
^{225}Fr		225.02561	3.9 m	β- /1.87		3/2	+1.07	+1.3	
^{226}Fr		226.0293	49. s	β- /3.6		1	+0.071	-1.35	0.18606 0.25373
^{227}Fr		227.0318	2.48 m	β- /2.5		1/2	+1.50		
^{228}Fr		228.0357	39. s	β- /≈3.5		2-	-0.76	+2.4	
^{229}Fr		229.0384	50. s	β- /					
^{230}Fr		230.0425	19. s	β- /		(3)			
^{231}Fr		231.0454	17. s	β- /					
^{232}Fr		232.0500	5. s	β- /					
$_{88}$Ra									
^{202}Ra			≈ 3 ms	α	7.86				
^{203m}Ra			0.03 s	α	7.62				
^{203}Ra		203.0092	≈ 4 ms	α	7.58				
^{204}Ra		204.0065	0.06 s	α	7.48				
^{205m}Ra			≈ 0.17 s						
^{205}Ra		205.0062	0.22 s	α	7.34				

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^{206}Ra		206.0038	0.4 s	α/7.416	7.272(5)/	0+			
^{207}Ra		207.0037	1.3 s	α/7.270	7.133(5)/				
^{208}Ra		208.0018	1.4 s	α/7.273	7.133(5)/	0+			
^{209}Ra		209.0019	4.6 s	α/7.150	7.008(5)/	5/2	+0.87	+0.38	
^{210}Ra		210.0005	3.7 s	α/7.610	7.020(5)/	0+			
^{211}Ra		211.0009	13. s	α/7.046 EC/5.0	6.912(5)/	(5/2-)	+0.878	+0.46	
^{212}Ra		211.99978	13.0 s	α/7.033	6.901(2)/	0+			
^{213m}Ra			2.1 ms	IT					
^{213}Ra		213.00034	2.7 m	EC/(20)/3.88 α/(80)/6.860	 6.521(3)/4.8 6.622(3)/39 6.730(3)/36	(1/2-)	+0.613		0.1024 0.11010 0.2125
^{214}Ra		214.00009	2.46 s	α/7.272	7.136(4)/	0+			
^{215}Ra		215.00270	1.6 ms	α/8.864	7.883(6)/2.8 8.171(3)/1.4 8.700(3)/95.9	(9/2+)			
^{216}Ra		216.00352	0.18 μs	α/9.526	9.349(8)/	0+			
^{217}Ra		217.00631	1.6 μs	α/9.161	8.992(8)/	9/2-			
^{218}Ra		218.00712	26. μs	α/8.547	8.390(8)/	0+			
^{219}Ra		219.01006	0.010 s	α/8.132	7.680(10)/65 7.982(9)/35				
^{220}Ra		220.01101	25. ms	α/7.593	6.998(7)/1.0 7.455(7)/99	0+			0.465
^{221}Ra		221.01391	29. s	α/6.879	6.254(10)/0.7 6.578(5)/3 6.585(3)/8 6.608(3)/35 6.669(3)/21 6.758(3)/31	5/2	-0.180	+1.9	
^{222}Ra		222.015361	36.2 s	α/5.590	6.237(2)/3.0 6.556(2)/97	0+			0.324 (0.1448-0.8402)
^{223}Ra		223.018497	11.435 d	α/5.979	5.287(1)/0.15 5.338(1)/0.13 5.365(1)/0.13 5.433(5)/2.3 5.502(1)/1.0 5.540(1)/9.2 5.607(3)/24 5.716(3)/52 5.747(1)/9 5.857(1)/0.32 5.872(1)/0.85	(3/2+)	+0.271	+1.2	Rn k x-ray 0.12231 0.14418 0.15418 0.15859 0.26939 0.32388 0.33328 0.44494 (0.10-0.7)
^{224}Ra		224.020202	3.66 d	α/5.789	5.034(10)/0.003 5.047(1)/0.007 5.164(5)/0.007 5.449(2)/4.9 5.685(2)/95	0+			Rn k x-ray 0.2407 0.4093 0.6501
^{225}Ra		225.023603	14.9 d	β- /0.36	0.32/100	(3/2+)	-0.734		Ac k x-ray 0.0434
^{226}Ra		226.025402	1599. y	α/4.870	4.194(1)/0.001 4.343(1)/0.006 4.601(1)/5.5 4.784(1)/94	0+			Rn k x-ray 0.1861 0.2624
^{227}Ra		227.029170	42. m	β- /1.325	1.03/	(3/2+)	-0.404	+1.5	Ac L x-ray

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
					1.30/				Ac k x-ray 0.02739
^{228}Ra		228.031063	5.76 y	β- /0.046	0.039/50 0.014/30 0.026/20	0+			0.0135 (0.006-0.0306)
^{229}Ra		229.0348	4.0 m	β- /1.76	1.76/	(3/2+)	+0.503	+3.0	(0.0145-0.1715)
^{230}Ra		230.03708	1.5 h	β- /1.0	0.7/	0+			0.0631 0.0720 0.2028 0.4698 0.4787
^{231}Ra		231.0412	1.7 m	β-					
^{232}Ra		232.0437	4. m	β-					
^{233}Ra		233.0480	30. s	β-					
^{234}Ra		234.051	≈ 30. s	β-/					
$_{89}$Ac									
^{206m}Ac			0.04 s	α	7.79				
^{206}Ac			≈ 26 ms	α	7.75				
^{207}Ac		207.0121	27 ms	α/	7.69				
^{208m}Ac			≈25. ms	α/	7.72				
^{208}Ac		208.0115	≈0.1 s	α/	7.62				
^{209}Ac		209.0096	≈0.09 s	α/	7.58				
^{210}Ac		210.0093	0.4 s	α/7.610	7.462(8)/				
^{211}Ac		211.0076	0.3 s	α/7.620	7.480(8)/				
^{212}Ac		212.0078	0.9 s	α/7.520	7.379(8)/				
^{213}Ac		213.0066	0.8 s	α/7.500	7.364(8)/	(9/2-)			
^{214}Ac		214.0069	8.2 s	α/(86)/7.350 EC/(14)/6.34	7.007(8)/3 7.082(5)/38 7.214(5)/45	(5+)			
^{215}Ac		215.0065	0.17 s	α/7.750	7.604(5)/	(9/2-)			
^{216m}Ac			0.33 ms	α/	8.198(8)/1.7 8.283(8)/2.5 9.028(5)/49 9.106(5)/46	(9-)			
^{216}Ac		216.00871	≈ 0.3 ms	α/9.241	8.990(2)/10 9.070(8)/90	(1)			
^{217m}Ac			0.7 μs	α/	10.540/100				
^{217}Ac		217.00933	0.07 μs	α/9.832	9.650(10)/100	9/2-			
^{218}Ac		218.01162	1.1 μs	α/9.380	9.205(15)/				
^{219}Ac		219.01241	0.012 ms	α/8.830	8.664(10)/	(9/2-)			
^{220}Ac		220.0148	26. ms	α/8.350	7.610(20)/23 4.680(20)/21 7.790(10)/13 7.850(10)/24 7.985(10)/4 8.005(10)/5 8.060(10)/6 8.195(10)/3				
^{221}Ac		221.01558	52. ms	α/7.790	7.170(10)/2 7.375(10)/10 7.440(15)/20 7.645(10)/70				

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{222m}Ac			63. s	α/(>89)/ EC/(1)/ I.T./(<10)/	6.710(20)/7 6.750(20)/13 6.810(20)/24 6.840(20)/9 6.890(20)/13 6.970(20)/7 7.000(20)/13				
^{222}Ac		222.01782	5. s	α/7.141	6.967(10)/6 7.013(2)/94	1-			
^{223}Ac		223.01913	2.1 m	α/(99)/6.783 EC/(1)/0.59	6.131(2)/0.12 6.177(2)/0.94 6.293(1)/0.47 6.326(1)/0.3 6.332(2)/0.14 6.360(1)/0.22 6.397(1)/0.13 6.448(1)/0.2 6.473(1)/3.1 6.523(2)/0.6 6.528(1)/3.1 6.563(1)/13.6 6.582(3)/0.3 6.646(1)/44 6.661(1)/31	(5/2-)			0.0725 0.0839 0.0927 0.0990 0.1917 0.2158 0.3588 0.4768
^{224}Ac		224.021708	2.7 h	EC/(90)/1.403 α/(10)/6.323	5.841(1)/0.5 5.860(1)/0.75 5.875(1)/1.7 5.941(1)/4.4 6.000(1)/6.7 6.013(1)/1.4 6.056(1)/22 6.138(1)/26 6.154(1)/1.0 6.204(1)/12 6.210(1)/20	0-			Ra L kx-ray Ra k x-ray 0.08426 0.13150 0.1571 0.21575 0.2619 (0.03-0.3)
^{225}Ac		225.02322	10.0 d	α/5.935	5.286(1)/0.2 5.444(3)/0.1 5.554(1)/0.1 5.608(1)/1.1 5.636(1)/4.5 5.681(1)/1.4 5.722(1)/2.9 5.731(1)/10 5.791(1)/9 5.793(1)/18	3/2			Fr k x-ray 0.9958 0.9982 0.1084 0.1116 0.1451 0.1539 0.15724 0.18799 0.19575 0.2162 0.21686 (0.025-0.52)
^{226}Ac		226.026089	1.224 d	EC/(17)/0.640 β- /(83)/1.116 α/(0.006)/5.510	5.399(5)/0.006	(1-)			Ra k x-ray Th k x-ray 0.07218 0.15816 0.23034
^{227}Ac	0.0838/23.	227.027747	21.77 y	β- /(98.6)/0.045		0.045/54	(3/2-)	+1.1	+1.7

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
				α/(1.4)/5.043	4.869(1)/0.09				0.0811/14.
					4.938(1)/0.52				0.2696/13.
					4.951(1)/0.65				(0.044-1.27)
^{228}Ac		228.031014	6.15 h	β- /2.127	1.11/32	(3+)			Th L x-ray
					1.85/12				Th k x-ray
					2.18/11				0.12903
									0.33842
									0.91116
									0.96897
									(0.2-1.96)
^{229}Ac		229.03293	1.04 h	β- /1.10	1.1/	(3/2+)			0.07450
									0.16451
									0.26188
									0.5085
									0.56916
^{230}Ac		230.0360	2.03 m	β- /2.7	1.4/	1+			Th k x-ray
									0.45497
									0.50820
									(0.12-2.5)
^{231}Ac		231.0386	7.5 m	β- /2.1	2.1/100	(1/2+)			0.14379
									0.18574
									0.22140
									0.28250
									0.3070
^{232}Ac		232.0420	2.0 m	β- /3.7		(2-)			
^{233}Ac		233.0446	2.4 m	β- /		(1/2+)			
^{234}Ac		234.0484	40. s	β- /		(1+)			
$_{90}$Th		**232.0381(1)**							
^{209}Th			≈ 0.01 s	α	8.08				
^{210}Th		210.0150	≈ 12 ms	α	7.90				
^{211}Th		211.0149	0.04 s	α	7.79				
^{212}Th		212.0129	≈ 30. ms	α/	7.80/	0+			
^{213}Th		213.0130	0.14 s	α/7.840	7.692(10)/				
^{214}Th		214.0115	0.09 s	α/7.825	7.677(10)/	0+			
^{215}Th		215.0117	1.2 s	α/7.660	7.33(10)/8	(1/2-)			
					7.395(8)/52				7.524(8)/40
^{216m}Th			0.18 ms	α					
^{216}Th		216.01105	28. ms	α/8.071	7.921(8)/	0+			
^{217}Th		217.01306	0.25 ms	α/9.424	9.250(10)/				
^{218}Th		218.01327	0.11 μs	α/9.847	9.665(10)/	0+			
^{219}Th		219.01552	1.05 μs	α/9.510	9.340(20)/				
^{220}Th		220.01573	10. μs	α/8.953	8.790(20)/	0+			
^{221}Th		221.01817	1.7 ms	α/8.628	7.743(8)/6				
					8.146(5)/56				
					8.4272(5)/39				
^{222}Th		222.01845	2.8 ms	α/8.129	7.982(8)/9.7	0+			
					7.600(15)/3				
^{223}Th		223.02079	0.65 s	α/7.454	7.29(1)/41(5)				
					7.32(1)/29(5)				
					7.350(15)/20(5)				
					7.390(15)/10(4)				
^{224}Th		224.02146	1.05 s	α/7.305	6.768(5)/1.2				
					6.997(5)/19				

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{225}Th		225.02394	8.72 m	EC/(10)/0.68 α/(90)/6.920	7.170(5)/79 6.441(2)/15 6.479(2)/43 6.501(3)/14 6.627(3)/3 6.650(5)/3 6.700(5)/2 6.743(3)/7 6.796(2)/9	(3/2+)			
^{226}Th		226.024891	30.83 m	α/6.454	6.026(1)/0.2 6.041(1)/0.19 6.098(1)/1.3 6.2283(4)/23 6.3375(4)/75	0+			Ra k x-ray 0.1112 0.2421 0.1310 (0.1733-0.9295)
^{227}Th		227.027699	18.72 d	α/6.146		(3/2+)			Ra L x-ray Ra k x-ray 0.05014 0.23597 0.25624 (0.02-1.0)
^{228}Th		228.028731	1.913 y	α/5.520	5.1770(2)/0.18 5.2114(1)/0.4 5.3405(1)/26.7 5.4233(1)/73	0+			
^{229}Th		229.031754	7.9×10^{3} y	α/5.168	4.814/9.3 4.845(5)/56 4.9008(5)/10.2 4.689-5.077	5/2+	+0.46	+4.	
^{230}Th		230.033126	7.54×10^{4} y	α/4.771	4.4383(6)/0.03 4.4798(6)/0.12 4.6211(6)/23.4 4.6876(6)/76.3	0+			0.0677/0.46 0.1439/0.078
^{231}Th		231.036296	1.063 d	β- /0.390	0.138/22 0.218/20 0.305/52	5/2+			Pa L x-ray Pa k x-ray 0.02564 0.084203/ (0.02-0.3)
^{232}Th	100.	232.038050	1.4×10^{10} y	α/4.081 SF/9×10^{-8}	3.830(10)/0.2 3.952(5)/23 4.010(5)/77	0+			0.0590 0.124
^{233}Th		233.041576	22.3 m	β- /1.245	1.245/	1/2+			Pa L x-ray Pa k x-ray 0.02938 0.08653 0.45930 (0.02-1.2)
^{234}Th		234.043596	24.10 d	β- /0.273	0.102/20 0.198/72	0+			Pa L x-ray 0.06329/4.1 0.09235/2.4 0.09278/2.4
^{235}Th		235.04751	7.2 m	β- /1.9					0.4162 0.6594 0.7272 0.747

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.9318
^{236}Th		236.0497	37.5 m	β- /≈ 1.0					Pa k x-ray
									0.1107
^{237}Th		237.0539	5.0 m	β-					
$_{91}$Pa		**231.03588(2)**							
^{212}Pa			≈ 5 ms	α	8.27				
^{213}Pa		213.0212	7 ms	α	8.24				
^{214}Pa		214.0207	17 ms	α	8.12				
^{215}Pa		215.0190	15. ms	α	8.08/100				
^{216}Pa		216.0190	0.19 s	α/	7.95/57				
					7.86/18				
					7.84/14				
^{217m}Pa			1.5 ms	α/	10.16/100				
^{217}Pa		217.0183	3.4 ms	α/8.490	8.340(10)/100				
^{218}Pa		218.0200	0.12 ms	α/	9.54/31				
					9.61/69				
^{221}Pa		221.0219	6. μs	α	9.08(3)				
^{222}Pa		222.0237	≈ 4.3 ms	α/8.700	8.180/50				
					8.330/20				
					8.540/30				
^{223}Pa		223.0240	≈ 6.5 ms	α/8.340	8.006(10)/55				
					8.196(10)/45				
^{224}Pa		224.0256	0.84 s	α/7.630	7.555(10)/75(3)				0.1945
					7.46(1)/25(3)				(0.028-0.412)
^{225}Pa		225.0261	1.8 s	α/7.380	7.195(10)/30				
					7.245(10)/70				
^{226}Pa		226.02792	1.8 m	α/(74)/6.987	6.728(10)/0.7				
				EC/(26)/2.83	6.823(10)/35				
					6.863(10)/39				
^{227}Pa		227.02879	38.3 m	α/(85)/6.582	6.357(4)/7	(5/2-)			0.0649
				EC/(15)/1.02	6.376(10)/2.2				0.0669
					6.401(4)/8				0.1100
					6.416(4)/13				
					6.423(10)/10				
					6.465(4)/43				
^{228}Pa		228.03100	22. h	EC/(98)/2.111		(3+)	+3.5		Th k x-ray
				α/(2)	5.779/0.23				0.20939
					5.805/0.15				0.27026
					6.078/0.4				0.28202
					6.105/0.25				0.32767
					6.118/0.22				0.32807
									0.46310
									0.91116
									0.96464
									0.96897
									(0.1-1.96)
^{229}Pa		229.03209	1.5 d	EC/(99.8)/0.32		(5/2)			0.04244
				α/(0.2)/5.836	5.536(2)/0.02				(0.024-0.18)
					5.579(2)/0.09				
					5.668(2)/0.05				
^{230}Pa		230.034532	17.4 d	EC/(90)/1.310	0.51/	(2-)	2.0		Th L x-ray
				β- /(10)/0.563					Th k x-ray
									0.4437

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.45477 0.89876 0.91856 0.95199 (0.053-1.07)
^{231}Pa		231.035878	3.25x10^{4} y	α/5.148	4.6781(5)/1.5 4.7102(5)/1.0 4.7343(5)/8.4 4.8513(5)/1.4 4.9339(5)/3 4.9505(5)/22.8 4.9858(5)/1.4 5.0131(5)/25.4 5.0292(5)/20 5.0318(5)/2.5 5.0587(5)/11	3/2-	2.01	-1.	Ac L x-ray Ac k x-ray 0.01899 0.027396 0.03823 0.04639 0.25586 0.26029 0.28367 0.30007 0.30264 0.33007 (0.02-0.61)
^{232}Pa		232.03858	1.31 d	β- /1.34		(2-)			U k x-ray 0.10900 0.15009 0.89439 0.96934 (0.10-1.17)
^{233}Pa		233.040239	27.0 d	β- /0.571	0.15/40 0.256/60	3/2-	+4.0	-3.0	U L x-ray U k x-ray 0.30017 0.31201 0.34059
^{234m}Pa			1.17 m	β- /(99.9)/2.29 IT/(0.13)/		(0-)			U k x-ray 0.25818/0.07 0.76641/0.32 1.0009/0.85 (0.06-1.96)
^{234}Pa		234.043303	6.69 h	β- /2.197	0.51/	(4+)			U L x-ray U k x-ray 0.1312/0.03 0.5695/0.02 0.9256/0.02 (0.02-1.99)
^{235}Pa		235.04544	24.4 m	β- /1.41	1.4/97	(3/2-)			0.0308-0.65893
^{236}Pa		236.0487	9.1 m	β- /2.9	1.1/40 2.0/50 3.1/10	(1-)			U k x-ray 0.64235 0.68759 1.7630 (0.04-2.18)
^{237}Pa		237.0511	8.7 m	β- /2.3	1.1/60 1.6/30 2.3/10	(1/2+)			0.4986 0.5293 0.5407 0.8536 0.8650 (0.04-1.4)
^{238}Pa		238.0545	2.3 m	β- /3.5	1.2/ 1.7/	(3-)			0.10350 0.1785 0.4484 0.6350

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.6800 1.01446 (0.04-2.5)
^{239}Pa		239.0571	1.8 h						
$_{92}$U		**238.0289(1)**							
^{218}U		218.0235	≈0.002 s	α	8.63(3)/				
^{219}U		219.0249	0.04 ms	α	9.68(4)/				
^{222}U		222.0261	≈ 1.μs	α					
^{223}U		223.0277	0.02 s	α/	8.78(4)/				
^{224}U		224.02759	≈ 1. ms	α/	8.46/100				
^{225}U		225.02938	0.09 s	α/	7.88/85 7.82/15				
^{226}U		226.02933	0.5 s	α/7.560	7.430/	0+			
^{227}U		227.03113	1.1 m	α/7.200	6.870/				
^{228}U		228.03137	9.1 m	α/6.803	6.404(6)/0.6 6.440(5)/0.7 6.589(5)/29 6.681(6)/70	0+			0.095 0.152 0.187 0.246
^{229}U		229.03350	58. m	EC/(80)/1.31 α/(20)/6.473	6.223/3 6.297(3)/11 6.332(3)/20 6.360(3)/64	(3/2+)			
^{230}U		230.033927	20.8 d	α/5.992	5.5866(3)/0.01 5.6624(3)/0.26 5.6663(3)/0.38 5.8178(3)/32 5.8887(3)/67	0+			Th L x-ray 0.07218 0.15421 0.23034 (0.081-0.8565)
^{231}U		231.03626	4.2 d	EC/0.36 α/(10-^{3})	 5.46/1.6 x 10-^{3} 5.47/1.4 x 10-^{3} 5.40/1. x 10-^{3}	(5/2-)			Pa L x-ray Pa k x-ray 0.02564 0.08420
^{232}U		232.037146	68.9 y	α/5.414	4.9979(1)/0.003 5.1367(1)/0.3 5.2635(1)/31 5.3203(1)/69	0+			
^{233}U		233.039627	1.59x10^{5} y	α/4.909	4.7830(8)/13.2 4.8247(8)/84.4 4.510-4.804	5/2+	+0.59	3.66	Th L x-ray 0.04244 0.09714 (0.0252-1.119)
^{234}U	0.0055(5)	234.040945	2.45x10^{5} y	α/4.856	4.604(1)/0.24 4.7231(1)/27.5 4.776(1)/72.5	0+			0.05323/0.156 0.12091
^{235m}U			26. m	IT/0.0007		1/2+			
^{235}U	0.720(1)	235.043922	7.04x10^{8} y	α/4.6793	4.1525(9)/0.9 4.2157(9)/5.7 4.3237(9)/4.6 4.3641(9)/11 4.370(4)/6 4.3952(9)/55 4.4144(9)/2.1 4.5025(9)/1.7 4.5558(9)/4.2 4.5970(9)/5.0	7/2-	-0.38	4.6	Th L x-ray Th k x-ray 0.10917 0.14378 0.16338 0.18574 0.20213 0.20533 0.22140 (0.03-0.79)

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{236}U		236.045561	2.34x10^{7} y	α/4.569	4.332(8)/0.26 4.445(5)/26 4.494(3)/74	0+			Th L x-ray 0.04937 0.11275
^{237}U		237.048723	6.75 d	β- /0.519	0.24/ 0.25/	1/2+			Np L x-ray Np k x-ray 0.05953 0.20801
^{238}U	99.2745(15)	238.050784	4.46x10^{9} y	α	4.039(5)/0.23 4.147(5)/23 4.196(5)/77	0+			Th L x-ray 0.04955/.06 0.1135/.01
^{239}U		239.054289	23.5 m	β- /1.265	1.2/ 1.3/	5/2+			(0.522-0.681)
^{240}U		240.056585	14.1 h	β- /0.39	0.36/	0+			Np L x-ray 0.04410 0.05558 0.06760
^{242}U		242.0629	16.8 m	β- /$\approx$ 1.2					
$_{93}$Np									
^{225}Np		225.0339							
^{226}Np		226.0351	0.03 s	α/	8.04(2)/				
^{227}Np		227.0350	0.51 s	α/	7.65(2)/ 7.68(1)/				
^{228}Np		228.0362	61. s	EC/60(7)/ α/40(7)/,SF					
^{229}Np		229.0363	4.0 m	α/7.010	6.890(20)				
^{230}Np		230.0378	4.6 m	EC/97 /3.6 α/3	6.660(20)				
^{231}Np		231.03823	48.8 m	EC/98 /1.8 α/2 /6.368	6.280/2	5/2			0.2629 0.3475 0.3703
^{232}Np		232.0400	14.7 m	EC/99 /2.7		(4-)			U L x-ray U k x-ray 0.3268 0.81925 0.86683
^{233}Np		233.0410	36.2 m	EC/1.2		(5/2+)			U L x-ray U k x-ray 0.29887 0.31201
^{234}Np		234.04289	4.4 d	β^{+} ,EC/1.81	0.79/	(0+)			U L x-ray U k x-ray 1.5272 1.5587 1.6022
^{235}Np		235.044055	1.085 y	EC/99.9 /0.124 α/0.001/5.191		5/2+			U k x-ray
^{236m}Np			22.5 h	EC/52 / β- /48 /		(1-)			U L x-ray Pu L x-ray U k x-ray 0.64235 0.68759
^{236}Np		236.04657	1.55x10^{5} y	EC/91 /0.94 β- /9 /0.49		(6-)			U L x-ray U k x-ray

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{237}Np		237.048166	2.14x10^{6} y	α/4.957	4.6395(5)/6.5 4.766(5)/9.7 4.7715(5)/22.7 4.7884(5)/47.8 4.558-4.873	5/2+	+3.14	+3.89	0.10423 0.16031 Pa L x-ray Pa k x-ray 0.029378/15 0.08653/12 (0.03-0.28)
^{238}Np		238.050940	2.117 d	β- /1.292	1.2/	2+			Pu L x-ray Pu k x-ray 0.98447/25.2 1.02855/18.3 (.044-1.026)
^{239}Np		239.052931	2.355 d	β- /0.722	0.341/30 0.438/48	5/2+			Pu L x-ray Pu k x-ray 0.10613 0.228186/11 0.27760/15 (0.04-0.50)
^{240m}Np			7.22 m	β- /99.9 / IT/0.1 /	2.18/	(1+)			0.25143 0.26333 0.55454 0.59735
^{240}Np		240.05617	1.032 h	β- /2.20	0.89/	5+			0.1471/ 0.5664 0.6008
^{241}Np		241.0583	13.9 m	β- /1.3	1.3/	5/2+			0.1330/ 0.1740 0.280
^{242m}Np			2.2 m	β- /		(1+)			0.15910 0.2651/ 0.78570
^{242}Np		242.0616	5.5 m	β- /2.7	2.7/	6+			0.9448/ 0.6209 0.73620 0.78074 1.47340 (0.04-2.37)
^{243}Np		243.0643	1.9 m						
^{244}Np		244.0678	2.3 m						
$_{94}$Pu									
^{228}Pu		228.0387		α/	7.81(2)/				
^{229}Pu		229.0362	4.0 m	α/	7.46(3)/				
^{230}Pu		230.03964	4.6 m	α/	7.05/				
^{232}Pu		232.04118	34. m	EC/>80/1.1 α/<20/6.716	 6.542(10)/38 6.600(10)/62	0+			
^{233}Pu		233.04299	20.9 m	EC(99.9)/1.9 α/0.1 /6.416	 6.300(20)/0.1				0.1503 0.1804 0.2353 0.5002

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
									0.5346/
^{234}Pu		234.04331	8.8 h	EC/94 /0.39		0+			1.0352/
				α/6 /6.310	6.035(3)/0.024				
					6.149(3)/1.9				
					6.200(3)/4.0				
^{235}Pu		235.0453	25.3 m	EC/99+ /1.2		(5/2+)			
				α/0.003/5.957	5.850(20)/0.003				
^{236}Pu		236.046048	2.87 y	α/5.867	5.611/0.21	0+			0.0476/0.07
					5.7210/30.5				0.109/0.02
					5.7677(1)/69.3				(0.17-0.97)
^{237}Pu		237.048403	45.7 d	EC/99.9 /0.220		7/2-			Np L x-ray
				α/0.003 /5.747	5.334(4)/0.0015				Np k x-ray
					5.356(4)/0.0006				0.026344
					5.650(4)/0.0007				0.03319
									0.05954
									(0.03-0.5)
^{238}Pu		238.049553	87.74 y	α/5.593	5.3583(1)/0.10	0+			U k x-ray
					5.465(1)/28.3				0.04347
					5.4992(1)/71.6				(0.04-1.1)
^{239}Pu		239.052156	2.411x10^{4} y	α/5.244	5.055/0.047	1/2+	+0.203		U k x-ray
					5.076/0.078				0.05162
					5.106/11.9				0.05682
					5.144/17.1				0.12928
					5.157/70.8				0.37502
					(4.74 -5.03)				0.41369
^{240}Pu		240.053807	6537. y	α/5.255	5.0212(1)/0.07	0+			U L x-ray
					5.1237(1)/26.4				0.04524
					5.1681(1)/73.5				0.10423
									(0.04-0.97)
^{241}Pu		241.056844	14.4 y	β- /99+ /0.0208	4.853(7)/3x10^{-4}	5/2+	-0.683	+6.	0.14854
				α/0.002 /5.139	4.8966(7)/0.002				0.1600
^{242}Pu		242.058736	3.76x10^{5} y	α/4.983	4.7546(7)/0.098	0+			U L x-ray
					4.8564(7)/22.4				0.04491
					4.9006(7)/78				0.10350
^{243}Pu		243.061996	4.956 h	β- /0.582	0.49/21	7/2+			Am L x-ray
					0.58/60				0.0417
									0.0839
^{244}Pu		244.064197	8.2x10^{7} y	α/99.9/4.665	4.546(1)/19.4	0+		U L x-ray	
				SF/0.1 /	4.589(1)/80.5				0.0439
^{245}Pu		245.06774	10.5 h	β- /1.21	0.93/57	(9/2-)			Am L x-ray
					1.21/11				Am k x-ray
									0.2804 /
									0.30832
									0.32752
									0.56014
									(0.03-1.2)
^{246}Pu		246.07020	10.85 d	β- /0.40	0.150/85	0+			Am L x-ray
					0.35/10				Am k x-ray
									0.04379
									0.22371
^{247}Pu		247.0741	2.3 d						

$_{95}$Am

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{232}Am		232.0466	0.9 m	EC/≈ 5.0					
^{234}Am		234.0478	2.3 m	EC/4.2					
^{235}Am		235.0480	≈ 15 m	EC					Pu K x-ray
^{237}Am		237.0503	1.22 h	EC/99.98 /1.7		(5/2-)			Pu k x-ray
				α/0.02 /6.20	6.042(5)/0.02				0.14559
									0.28026
									0.43845
^{238}Am		238.05198	1.63 h	EC/2.26		1+			Pu L x-ray
				α/0.0001 /6.04	5.940/0.0001				Pu k x-ray
									0.91870
									0.96278
^{239}Am		239.053018	11.9 h	EC/99.99 /0.803			5/2-		Pu L x-ray
				a/0.01 /5.924	5.734(2)/0.001				Pu k x-ray
					5.776(2)/0.008				0.18172
									0.22818
									0.27760
^{240}Am		240.05529	2.12 d	EC/1.38		(3-)			Pu L x-ray
				α/5.592	5.378(1)/16x10^{-4}				Pu k x-ray
									0.88878
									0.98764
									(0.1-1.3)
^{241}Am		241.056822	432.2 y	α/5.637	5.2443(1)/0.002	5/2-	+1.61	+4.	Np L x-ray
					5.3221(1)/0.015				0.02634
					5.3884(1)/1.4				0.033192
					5.4431(1)/12.8				0.059536
					5.4857(1)/85.2				(0.03-1.128)
					5.5116(1)/0.20				
					5.5442(1)/0.34				
^{242m}Am			141. y	IT/99.5 /0.048		5-	+1.0	+6.5	Am L x-ray
				α/0.5 /5.62	5.141(4)/0.026				0.04863
					5.2070(2)/0.4				0.08648
									0.10944
									0.16304
^{242}Am		242.059542	16.02 h	β- /83 /0.665	0.63/46	1-	+0.388	-2.4	Pu L x-ray
				EC/17 /0.750	0.67/37				Cm L x-ray
									Pu k x-ray
									0.0422
									0.04453
^{243}Am		243.061372	7.37x10^{3} y	α/5.438	5.1798(5)/1.1	5/2-	+1.61	+4.	0.04354
					5.2343(5)/11				0.07467
					5.2766(5)/88				0.08657
					5.394(5)/0.12				0.11770
					5.3500(5)/0.16				0.14197
^{244m}Am			≈ 26. m	β- /1.498		(1-)			0.0429
^{244}Am		244.064279	10.1 h	β- /1.428					Am L x-ray
									Cm k x-ray
									0.7460
									0.9000
^{245}Am		245.066444	2.05 h	β- /0.894	0.65/19	(5/2+)			Cm L x-ray
					0.90/77				Cm k x-ray
									0.25299
^{246m}Am			25.0 m	β- /	1.3/79.	2-			Cm L x-ray
					1.60/14				Cm k x-ray
					2.1/7				0.27002
									0.79881

TABLE OF THE ISOTOPES

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									1.06201 1.07885 (0.04-2.29)
^{246}Am		246.06977	39. m	β- /2.38	1.2/	(7-)			Cm L x-ray Cm k x-ray 0.1529 0.2046 0.6786
^{247}Am		247.0722	22. m	β- /1.7					Cm L x-ray Cm k x-ray 0.2267 / 0.2853 /
$_{96}$Cm									
^{236}Cm		236.0514		EC/1.7					
^{237}Cm		237.0529		EC/2.5					
^{238}Cm		238.05302	2.4 h	EC/>90 /0.97 α/<10 /6.632	6.520(50)/<10	0+			
^{239}Cm		239.0548	≈ 3. h	EC/1.7					0.0407 0.1466 0.1874
^{240}Cm		240.055519	27. d	α/6.397	5.989/0.014 6.147/0.05 6.2478(6) /28.8 6.2906(6) /70.6	0+			
^{241}Cm		241.057646	32.8 d	EC/99 /0.768 α/1 /6.184	5.8842(4)/0.12 5.9291(4)/0.18 5.9389(4)/0.69	1/2+			Am k x-ray 0.13241 0.16505 0.18028 0.43063 0.47181
^{242}Cm		242.058828	162.8 d	α/6.216	5.9694(1)/0.035 6.069(1)/25 6.1129(1)/74	0+			Pu L x-ray 0.04408 0.10189 (0.04-1.2)
^{243}Cm		243.061381	28.5 y	α/6.167	5.6815(5) /0.2 5.6856(5)/1.6 5.7420(5)/10.6 5.7859(5)/73.3 5.9922(5)/6.5 6.0103(5)/1.0 6.0589(5)/5 6.0666(5)/1.5	5/2+	0.41		Pu L x-ray Pu k x-ray 0.10612 0.20975 0.22819 0.27760 0.28546 0.33431 (0.04-0.7)
^{244}Cm		244.062745	18.11 y	α/5.902	5.6656(1)/0.02 5.7528(1)/24 5.8050(1)/76	0+			Pu L x-ray 0.04282 0.09885 0.15262
^{245}Cm		245.065485	8.5x10^{3} y	α /5.623	5.235(10)/0.3 5.3038(10)/5.0 5.3620(7)/93 5.4927(11)/0.8 5.5331(11)/0.6	7/2+	0.5		Pu L x-ray Pu k x-ray 0.04195 0.13299 0.13606 0.17494

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin ($h/2\pi$)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{246}Cm		246.067217	4.78x10^3 y	α/5.476	5.343(3)/21 5.386(3)/79	0+			Pu L x-ray 0.04453
^{247}Cm		247.070346	1.56x10^7 y	α/5.352	4.818(4)/4.7 4.8690(20)/71 4.941(4)/1.6 4.9820(20)/2.0 5.1436(20)/1.2 5.2104(20)/5.7 5.2659(20)/13.8	9/2- 9/2-	0.37		Pu k x-ray 0.2792 0.2886 0.3471 0.4035
^{248}Cm		248.072341	3.4x10^5 y	α/92 /5.162 SF/8/	4.931(5)/0.07 5.0349(2)/16.5 5.0784(2)/(75)/1	0+			
^{249}Cm		249.075946	64.15 m	β- /0.900	0.9/	1/2+			Bk k x-ray 0.56039 0.63431
^{250}Cm		250.07835	$\approx$ 9.7x10^3 y	SF/ α/5.27		0+			
^{251}Cm		251.08228	16.8 m	β- /1.42	0.90/16	(1/2+)			0.3896 / 0.5299 0.5425
^{252}Cm		252.0849	< 2 d						
$_{97}$Bk									
^{238}Bk		238.0583	2.4 m	EC/5.0					
^{240}Bk		240.0598	$\approx$ 4.8 m						
^{242}Bk		242.0621	7.0 m	EC/3.0					
^{243}Bk		243.063001	4.5 h	EC/99.8 /1.508 α/0.15 /6.871	6.542(4)/0.03 6.5738(2)/0.04 6.7180(22)/0.02 6.7581(20)/0.02	(3/2-)			0.1466 0.1874 0.755 0.840 0.946
^{244}Bk		244.0652	4.4 h	EC/99.99 /2.26 α/0.01 /6.778	6.625(4)/0.003 6.667(4)/0.003	(4-)			0.1445 0.1876 0.2176 0.9815 0.9215/
^{245}Bk		245.066355	4.94 d	EC/99.9 /0.810 α/0.1 /6.453	5.8851(5)/0.03 6.1176(9)/0.01 6.1467(5)/0.02 6.3087(5)/0.014 6.3492(5)/0.018	3/2-			Cm L x-ray Cm k x-ray 0.25299 0.3809 0.3851
^{246}Bk		246.0687	1.80 d	EC/1.35		(2-)			Cm L x-ray Cm k x-ray 0.79881 1.08142
^{247}Bk		247.07030	1.4x10^3 y	α/5.889	5.465(5)/1.5 5.501(5)/7 5.532(5)/45 5.6535(20)/5.5 5.678(2)/13 5.712(2)/17 5.753(2)/4.3 5.794(2)/5.5	(3/2-)			0.04175 0.0839 0.268

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^{248}Bk		248.07311	23.7 h	β- /70 /0.87 EC/30 /0.72	0.86/	(1-)			Cm L x-ray Cf L x-ray Cm k x-ray Cf k x-ray 0.5507
^{249}Bk		249.074980	320. d	β- /0.125 α/0.001 /5.525	0.125/100 5.390(1)/0.0002 5.4174(6)/0.001	7/2+	2.0		0.327/10^{-5} 0.308/10^{-6}
^{250}Bk		250.078309	3.217 h	β- /1.780	0.74/	2-			Cf L x-ray Cf k x-ray 0.98912 1.03184 (0.04-1.6)
^{251}Bk		251.08075	56. m	β- /1.09		(3/2-)			0.02481 0.1528 0.1776
^{252}Bk		252.0843	1.8 m						
$_{98}$Cf									
^{237}Cf		237.0621	2.1 s	α,SF/10					
^{238}Cf		238.0614	21 ms	SF					
^{239}Cf		239.0626	$\approx$ 0.7 m	α					
^{240}Cf		240.0623	1.1 m	α/7.719,SF/2	7.590(10)/	0+			
^{241}Cf		241.0637	4. m	EC/3.3 α/7.60	7.335(5)/				
^{242}Cf		242.06369	3.5 m	α/7.509 SF/0.014	7.351(6)/20 7.385(4)/80	0+			
^{243}Cf		243.0654	11. m	EC/86 /2.2 α/14 /7.40	7.060(6)/20 7.170/4	(1/2+)			
^{244}Cf		244.065990	20. m	α/7.328	7.168(5)/25 7.210(5)/75	0+			
^{245}Cf		245.068038	44. m	α/30 /7.255 EC/70 /1.569	7.15/91.7 6.983/0.31 7.09/7 7.065/0.68				Cm K x-ray 0.5709 0.6014 0.6163
^{246}Cf		246.068798	1.49 h	α/6.869	6.6156(10)/0.18 6.7086(7)/21.8 6.7501(7)/78.0	0+			Cm L x-ray 0.04221 0.0945 0.147
^{247}Cf		247.07099	3.11 h	EC/99.96 /0.65 α/0.04 /6.55	6.301(5)/	7/2+			Bk k x-ray 0.2941 0.4778
^{248}Cf		248.07218	334. d	α/6.369 SF/0.0029	6.220(5)/17 6.262(5)/83	0+			
^{249}Cf		249.074846	351. y	α/6.295	5.7582(2)/3.7 5.8119(2)/84 5.8488(2)/1.0 5.9029(2)/2.8 5.9451(2)/4.0 6.1401(2)/1.1 6.1940(2)/2.2	9/2-			Cm L x-ray Cm k x-ray 0.25299 0.33351 0.38832 (0.0376-1.103)
^{250}Cf		250.076399	13.1 y	α/6.129 SF/0.077	5.8913(4)/0.3 5.9889(4)/15	0+			Cm L x-ray 0.04285

TABLE OF THE ISOTOPES

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^{251}Cf		251.079579	9.0x10^2 y	α/6.172	6.0310(4)/84.5 5.56448(7)/1.5 5.632(1)/4.5 5.648(1)/3.5 5.6773(6)/35 5.762(3)/3.8 5.7937(7)/2.0 5.8124(8)/4.2 5.8514(6)/27 6.0140(7)/11.6 6.0744(7)/2.7	1/2+			
^{252}Cf		252.081619	2.65 y	α/96.9 /6.217 SF/3.1/	5.7977(1)/0.23 6.0756(4)/15.2 6.1184(4)/81.6	0+			Cm L x-ray 0.04339 0.1002
^{253}Cf		253.08512	17.8 d	β- /99.7 /0.29 α/0.3 /6.126	0.27/100 5.921(5)/0.02	(7/2+)			
^{254}Cf		254.08732	60.5 d	SF/99.7/ α/0.3/5.930	5.792(5)/0.05 5.834(5)/0.26	0+			
^{255}Cf		255.0910	1.4 h	β- /0.7					
^{256}Cf		256.0934	12. m	SF					
$_{99}$Es									
^{241}Es		241.0687	≈ 8 s	α	8.11				
^{242}Es		242.0697	16 s	α	7.92				
^{243}Es		243.0696	21. s	α/>30 / EC/<70 /4.0	7.89/>30				
^{244}Es		244.0709	37. s	EC/76 /4.6 α/4 /	7.57/4				
^{245}Es		245.0713	1.3 m	α/40 /7.858 EC/60 /3.1	7.74				
^{246}Es		246.0730	7.7 m	EC/90 /3.9 α/10 /	7.35				
^{247}Es		247.07365	4.8 m	EC/93 /2.48 α/7 /	7.32				
^{248}Es		248.0755	26. m	EC/99.7 /3.1 α/0.3 /	6.87				
^{249}Es		249.07640	1.70 h	EC/99.4 /1.45 α/0.6 /	6.77	(7/2+)			0.3795 0.8132
^{250m}Es			2.2 h	EC/ β^+		(1-)			Cf L x-ray Cf k x-ray 0.9891 1.0319
^{250}Es		250.0787	8.6 h	EC/2.1		(6+)			Cf L x-ray Cf k x-ray 0.30339 0.34948 0.82883
^{251}Es		251.07998	1.38 d	EC/99.5 /0.38 α/0.5 /	6.462/0.05 6.492/0.4	(3/2-)			
^{252}Es		252.08297	1.29 y	α/76 / EC/24 /1.26	6.632/61.0 6.562/10.3	(5-)			
^{253}Es		253.084818	20.47 d	α/	6.633/89.8	7/2+	+4.10	7.	0.04180

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
					6.5916/6.6				0.3892
^{254m}Es			1.64 d	β- /99.6 /	0.475	2+	2.9	3.7	Fm L x-ray
				α/0.3 /6.67	6.382	2+			Fm k x-ray
									0.6488
									0.6938
^{254}Es		254.088017	276. d	α/	6.429	(7+)			0.064
^{255}Es		255.09027	40. d	β- /92 /0.29		(7/2+)			
				α/8 /	6.26				
				SF/0.004/	6.300				
^{256m}Es			7.6 h	β- /		(8+)			0.218
									0.232
									0.862
^{256}Es		256.0936	25. m	β- /1.7		(1+)			
$_{100}$Fm									
^{242}Fm		242.0734	0.8 ms	SF					
^{243}Fm		243.0745	0.2 s	α/	8.55				
^{244}Fm		244.0741	3.7 ms	SF/		0+			
^{245}Fm		245.0754	4. s	α/	8.15/				
^{246}Fm		246.07528	1.2 s	α/92 /	8.24/	0+			
				SF/8/					
^{247m}Fm			9. s	α/	8.18/				
^{247}Fm		247.0768	35. s	α/8.20	7.87/70				
				EC/2.9	7.93/30				
^{248}Fm		248.07718	36. s	α/99.9 /8.001	7.83/20	0+			
				SF/0.1/	7.87/80				
^{249}Fm		249.0790	3. m	EC/2.4		(7/2+)			
				α/	7.53				
^{250m}Fm			1.8 s	IT/					
^{250}Fm		250.07951	30. m	α/	7.43/	0+			
				EC/0.8					
^{251}Fm		251.08157	5.3 h	EC/98 /1.47		(9/2-)			
				α/2 /	6.833				
^{252}Fm		252.08246	1.058 d	α/7.154	6.998/15	0+			
				SF	7.039/85				
^{253}Fm		253.085175	3.0 d	EC(88%)/0.333	6.676/	1/2+			Es k x-ray
				α/12 /	6.943/				0.2719
^{254}Fm		254.086847	3.240 h	α/	7.150	0+			
				SF/0.06/	7.192				
^{255}Fm		255.089955	20.1 h	α/	6.9635(5)/5.0	7/2+			
					7.0225(5)/93.4				
^{256}Fm		256.09177	2.63 h	SF/92/		0+			
				α/18 /	6.92/				
^{257}Fm		257.09510	100.5 d	α/99.8 /	6.519	(9/2+)			0.1794
				SF/0.2					0.2410
^{258}Fm		258.0971	0.37 ms	SF/					
^{259}Fm		259.1006	1.5 s	SF/					
$_{101}$Md									
^{245m}Md			≈ 0.4 s	α	8.64,8.68				
^{245}Md		245.0810	0.9 ms	SF					
^{246}Md		246.0819	1.0 s	α	8.74				
					8.50-8.56				

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{247}Md		247.0818	3. s	α	8.43				
^{248}Md		248.0828	7. s	EC/80 /5.3	8.32/15				
				α/20 /	8.36/5				
^{249}Md		249.0830	24. s	EC>/<80 /3.7					
				α/>20 /8.46	8.030(20)/				
^{250}Md		250.0845	50. s	EC/94 /4.6	7.75/4				
				α/6 /8.25	7.83/2				
^{251}Md		251.0849	4.0 m	EC/>94 /3.1					
				α/<6 /	7.55/				
^{252}Md		252.0866	2. m	EC/>50 /3.9					
				α/<50 /	7.73/				
^{253}Md		253.0873	≈6 m	EC/2.0					
^{254m}Md			30. m	EC/					
^{254}Md		254.0897	10. m	EC/2.7					
^{255}Md		255.09108	27. m	EC/92 /1.04		(7/2-)			0.4531
				α/8 /	7.33				0.4056
^{256}Md		256.0941	1.30 h	EC/89 /2.13	7.22/47				
				α/11 /	7.155/21				Fm k x-ray (0.112-0.834)
^{257}Md		257.095535	5.5 h	EC/85 /0.41	7.074	(7/2-)			Fm k x-ray
				α/15 /,SF	7.014				(0.181-0.389)
^{258m}Md			57. m	EC/		(1-)			Fm k x-ray
^{258}Md		258.098427	51.5 d	α/7.40	6.718(2)/	(8-)			0.3678
					6.763(4)/				(0.057-0.448)
^{259}Md		259.1005	1.64 h	SF/		7/2+			
				α/<1.3					
^{260}Md		260.104	≈ 27.8 d	SF/					
$_{102}$No									
^{250}No		250.0875	0.25 ms	SF/		0+			
^{251}No		251.0889	0.8 s	α/	8.60/80				
					8.68/20				
^{252}No		252.08897	2.3 s	α/73 /8.551	8.42	0+			
				SF/27/	8.37				
^{253}No		253.0907	1.7 m	α/	8.010(20)	(9/2-)			
				EC/3.2					
^{254m}No			0.28 s	I.T./					
^{254}No		254.09095	55. s	α/	8.09	0+			
				EC/1.1					
^{255}No		255.09323	3.1 m	α/62 /	8.12/	1/2+			0.187
				EC/38/2.01	7.93				
					8.08				
^{256}No		256.09428	2.9 s	α/	8.43	0+			
^{257}No		257.09685	25. s	α/	8.22	(7/2+)			
					8.27				
					8.32				
^{258}No		258.0983	≈ 1.2 ms	SF/		0+			
^{259}No		259.1011	58. m	α/78 /7.794	7.52	(9/2+)			
				EC/22/0.5	7.55				
^{262}No		262.108	≈ 8. ms	SF/					
$_{103}$Lr									
^{253}Lr		253.0953	1.3 s	α/	8.80				

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
					8.72				
^{254}Lr		254.0965	13. s	α/	8.45				
				EC/5.2					
^{255}Lr		255.0967	22. s	α/	8.37/60				
				EC/3.2	8.43/40				
^{256}Lr		256.0988	28. s	α/99.7 /8.554	8.43/				
				EC/4.2	8.39				
^{257}Lr		257.0996	0.65 s	α/	8.80	7/2+			
				EC/2.5	8.80				
^{258}Lr		258.1019	3.9 s	α/	8.60				
				EC/3.4	8.62				
					8.56				
^{259}Lr		259.1030	6.1 s	α/80	8.44(1)				
				SF/20					
^{260}Lr		260.1056	3. m	α/	8.03				
^{261}Lr		261.1069	40. m	SF					
^{262}Lr		262.110	3.6 h	EC/2.					
$_{104}$Rf									
^{253}Rf		253.1007	≈ 48. μs	SF					
				α/<10					
^{254}Rf		254.1002	23. μs	SF					
				α/<1.5					
^{255}Rf		255.1015	1.7 s	α	8.72				
				SF/45	8.77				
^{256}Rf		256.10118	6.2 ms	SF					
				α/0.32	8.81				
^{257}Rf		257.1031	4.7 s	α/9.22	8.77				
	0.117								
				EC/11	9.01				
				SF/<1.4	8.95				
					8.62				
^{258}Rf		258.1036	12. ms	SF,α					
^{259}Rf		259.1056	3.4 s.	α/9.09/93	8.77(2)/				
				SF/7	8.86/				
^{260}Rf		260.1064	20. ms	SF/					
^{261}Rf		261.1088	1.1 m	α/8.78,SF/<10	8.28/				
^{262}Rf		262.1101	2.1 s	SF/					
^{263}Rf		263.1125	<20. m	SF					
$_{105}$Db									
^{255}Db		255.1074	≈ 1.5 s	α,SF					
^{256}Db		256.1081	≈ 2.6 s	α,SF,E.C.					
^{257}Db		257.1079	1.5 s	α/	8.97/				
				SF	9.07/				
					9.16/				
^{258}Db		258.1094	4.2 s	α/	9.17/				
				E.C/5.3	9.08/				
^{259}Db		259.1097	≈ 1.2 s	SF/					
^{260}Db		260.1114	1.5 s	α/	9.05/				
				SF/	9.08/				
					9.13/				
^{261}Db		261.1121	1.8 s	α/	8.93/				

TABLE OF THE ISOTOPES

Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
				SF/					
^{262}Db		262.1141	34. s	SF/					
				α/	8.45/				
					8.53/				
					8.67/				
^{263}Db		263.1151	≈0.45 m	SF/57/, α/43/	8.35/43				
$_{106}$Sg									
^{258}Sg		258.1132	≈ 2.9 ms	SF					
				α/<20					
^{259}Sg		259.1147	0.5 s	α,SF/	9.62				
^{260}Sg		260.11444	4. ms	α,SF/	9.77				
					9.72				
^{261}Sg		261.1162	0.3 s	α,SF/	9.56				
^{263}Sg		263.1183	0.8 s	SF,α	9.06				
					9.25/				
^{265}Sg		265.1211	<30. s	α/>50					
				SF/<50					
^{266}Sg		266.1219	<30. s	α/>50	8.63(5)				
				SF/<50					
$_{107}$Bh									
^{260}Bh		260.122		α					
^{261}Bh		261.1218	12. ms	α/,SF	10.40				
					10.10				
					10.03				
^{262m}Bh			8. ms	α/	10.37				
					10.24				
^{262}Bh		262.1230	0.10 s	α/	10.06				
					9.91				
					9.74				
^{264}Bh		264.1247	0.44 s	α	9.47				
					9.62				
$_{108}$Hs									
^{263}Hs		263.1287		α/					
^{264}Hs		264.1284	≈ 0.08 ms	α/,SF/≈50	11.0				
^{265m}Hs			0.9 ms	α	10.57				
^{265}Hs		265.1300	≈1.6 ms	α/	10.31				
^{267}Hs		267.1371	60 ms	α/>88	9.74-9.87				
^{269}Hs		269.1341	19.7 s	α	9.23				
$_{109}$Mt									
^{266m}Mt			≈1.2 ms	α	10.46-10.81				
^{266}Mt		266.1379	≈0.7 ms	α	10.48-11.31				
^{267}Mt		267.138	19 ms	α					
^{268}Mt		268.1388	0.07 s	α/>68	10.10,10.24				
$_{110}$110									
^{267}110		267.1440	≈ 3 μs	α/>32	11.6				

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Elem. or Isot.	Natural Abundance (%)	Atomic Mass or Weight	Half-Life	Decay Mode /Energy (/MeV)	Particle Energy /Intensity (MeV/%)	Spin (h/2π)	Nuclear Magnetic Mom. (nm)	Elect. Quadr. Mom. (b)	γ-Ray Energy /Intensity (MeV/%)
^{269}110		269.1451	0.17 ms	α/>75	11.11				
^{271m}110			≈56 ms	α	10.71				
^{271}110		271.1461	≈ 1.1 ms	α	10.68,10.74				
^{273}110		273.1492	0.3 ms	α/>32	11.35				
$_{111}$111									
^{272}111		272.1535	≈1.5 ms	α/>68	10.8				
$_{112}$112									
^{277}112			≈ 0.24 ms	α	11.45				