^{91}Mo ε decay (15.49 min) 1976De37

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 114, 1293 (2013)	1-Sep-2013

Parent: ^{91}Mo: E=0.0; $J^\pi=9/2^+$; $T_{1/2}$=15.49 min *1*; Q(ε)=4430 *7*; %ε+%$β^+$ decay=100.0

Others: 1956Sm96, 1970De34, 1970He03, 1976Fi14, 1993Os06, 2001Ko07.

1976De37:Ge(Li) anti-Compton spectrometer. The extended version of this work is reported in 1975DeZX.

1970He03:Ge(Li) detectors; measured Eγ, Iγ.

1976Fi14: 4π CaF_2(Eu) scin; NaI(Tl). Measured I(K x ray) and I$β^+$. Deduced I(εK(exp))/I$β^+$.

^{91}Nb Levels

E(level)	J^π[†]	$T_{1/2}$[†]	Comments
0.0	$9/2^+$	6.8×10^2 y *13*	
104.61 *5*	$1/2^-$	60.86 d *22*	%ε=3.4 *5*; %IT=96.6 *5* I(γ+ce) feeding level: 0.0342% 23.
1186.87 *11*	$5/2^-$		
1581.48 *10*	$(7/2)^+$		
1637.32 *10*	$(9/2^+)$		
1790.84 *24*	$(9/2^-)$		
1845.03 *21*	$(5/2)^-$		
2530.8 *4*	$(11/2^-)$		
2632.16 *22*	(9/2)		
2792.39 *19*	$(7/2^+)$		
3028.65 *18*	$7/2,9/2,11/2^{(+)}$		
3149.3 *4*	7/2,9/2,11/2		
3187.9 *5*	7/2,9/2,11/2		
3837.7 *6*	$(7/2,9/2^-)$		
3886.8 *6*	$7/2,9/2,11/2^{(-)}$		
3916.8 *6*	7/2,9/2,11/2		
4180.7 *11*	7/2,9/2,11/2		

[†] From Adopted Levels.

ε,$β^+$ radiations

E(decay)	E(level)	I$β^+$ [‡]	Iε[‡]	Log *ft*	I(ε+$β^+$)[‡]	Comments
(249 *7*)	4180.7		0.0020 *7*	6.50 *16*	0.0020 *7*	εK=0.8564 *6*; εL=0.1166 *5*; εM+=0.02695 *11*
(513 *7*)	3916.8		0.0016 *7*	7.26 *19*	0.0016 *7*	εK=0.8652 *1*; εL=0.10967 *9*; εM+=0.02511 *3*
(543 *7*)	3886.8		0.0023 *7*	7.15 *14*	0.0023 *7*	εK=0.8657 *1*; εL=0.10933 *8*; εM+=0.02502 *2*
(592 *7*)	3837.7		0.0030 *7*	7.12 *11*	0.0030 *7*	εK=0.8663; εL=0.10884 *7*; εM+=0.02489 *2*
(1242 *7*)	3187.9	6.0×10^{-6} *17*	0.0053 *8*	7.53 *7*	0.0053 *8*	av Eβ=103.3 *31*; εK=0.8688 *2*; εL=0.10598 *3*; εM+=0.024137 *8*
(1281 *7*)	3149.3	0.00012 *2*	0.055 *5*	6.54 *4*	0.055 *5*	av Eβ=120.0 *31*; εK=0.8679 *2*; εL=0.10579 *4*; εM+=0.02409 *1*
(1401 *7*)	3028.65	0.00098 *9*	0.096 *6*	6.37 *3*	0.097 *6*	av Eβ=171.8 *30*; εK=0.8613 *7*; εL=0.10474 *9*; εM+=0.02385 *2*
(1638 *7*)	2792.39	0.0013 *2*	0.021 *3*	7.18 *6*	0.022 *3*	av Eβ=273.1 *31*; εK=0.8191 *20*; εL=0.0993 *3*; εM+=0.02259 *6*
(1798 *7*)	2632.16	0.0154 *12*	0.108 *7*	6.54 *3*	0.123 *8*	av Eβ=342.4 *31*; εK=0.762 *3*; εL=0.0922 *4*; εM+=0.02097 *9*
(1899 *7*)	2530.8	0.00077 *25*	0.0035 *11*	8.07 *15*	0.0043 *14*	av Eβ=386.6 *32*; εK=0.715 *4*; εL=0.0864 *5*; εM+=0.01966 *10*
(2585 *7*)	1845.03	0.0042 *3*	0.0093 *7*	9.32^{1u} *4*	0.0135 *10*	av Eβ=715.8 *54*; εK=0.601 *6*; εL=0.0734 *7*; εM+=0.01672 *15*

Continued on next page (footnotes at end of table)

^{91}Mo ε decay (15.49 min) 1976De37 (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)‡	Comments
(2639 *7*)	1790.84	0.0185 *14*	0.0114 *9*	7.85 *4*	0.0299 *23*	av Eβ=716.1 *32*; εK=0.331 *5*; εL=0.0398 *4*; εM+=0.00906 *8*
(2793 *7*)	1637.32	0.224 *14*	0.103 *7*	6.95 *3*	0.327 *21*	av Eβ=785.9 *32*; εK=0.2748 *24*; εL=0.0330 *3*; εM+=0.00751 *7*
(2849 *7*)	1581.48	0.147 *10*	0.061 *4*	7.19 *3*	0.208 *14*	av Eβ=811.4 *32*; εK=0.2568 *22*; εL=0.0309 *3*; εM+=0.00702 *6*
(3243 *7*)	1186.87	0.0064 *11*	0.0041 *7*	10.08[1u] *8*	0.0105 *18*	av Eβ=1012.7 *32*; εK=0.3408 *23*; εL=0.0414 *3*; εM+=0.00941 *7*
4435† *23*	0.0	93.32 *9*	5.81 *8*	5.598 *7*	99.13 *5*	av Eβ=1549.5 *34*; εK=0.0511 *3*; εL=0.00611 *4*; εM+=0.001389 *8* I(ce(K))/Iβ+=0.0505 *34* (based on I(K x ray)/Iβ+=0.0378 *9* (1976Fi14), assuming ω_K=0.75 *3*) cf. 0.0541 from theory.

† From β+ endpoint energy of 3413 *23* (1993Os06,2001Ko07). Other β+ endpoint energy: 3440 *30* (1956Sm96).
‡ Absolute intensity per 100 decays.

^{91}Mo ε decay (15.49 min) 1976De37 (continued)

γ(^{91}Nb)

Iγ normalization: Deduced by the evaluator from Iγ±=57000 *3000* (1976De37).

E_γ[‡]	I_γ[#a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	δ[@]	α[†]	Comments
(104.62 *5*)		104.61	1/2$^-$	0.0	9/2$^+$	M4		167.3	α(K)=114.7 *17*; α(L)=43.1 *7*; α(M)=8.28 *12*; α(N+..)=1.168 *17* α(N)=1.132 *17*; α(O)=0.0356 *5* Not observed in this experiment. Eγ from Adopted Gammas.
1050.9 *3*	1.6 *2*	2632.16	(9/2)	1581.48	(7/2)$^+$				I_γ: 10.8 *20* from 1970He03.
1082.3[&] *1*	6.3 *4*	1186.87	5/2$^-$	104.61	1/2$^-$	E2		0.000603 *9*	α=0.000603 *9*; α(K)=0.000531 *8*; α(L)=5.94×10^{-5} *9*; α(M)=1.044×10^{-5} *15*; α(N+..)=1.616×10^{-6} *23* α(N)=1.528×10^{-6} *22*; α(O)=8.79×10^{-8} *13*
1156.3[b] *4*	1.1 *3*	2792.39	(7/2$^+$)	1637.32	(9/2$^+$)				I_γ: 3.2 *10* from 1970He03.
1447.2[&] *2*	3.8 *3*	3028.65	7/2,9/2,11/2$^{(+)}$	1581.48	(7/2)$^+$				
1581.5[&] *1*	68.7 *23*	1581.48	(7/2)$^+$	0.0	9/2$^+$	M1+E2	+0.24 *+10−9*	0.000383 *6*	α=0.000383 *6*; α(K)=0.000251 *4*; α(L)=2.75×10^{-5} *4*; α(M)=4.84×10^{-6} *7*; α(N+..)=9.95×10^{-5} *17* α(N)=7.11×10^{-7} *10*; α(O)=4.20×10^{-8} *6*; α(IPF)=9.88×10^{-5} *17*
1605.8[&] *2*	3.1 *3*	2792.39	(7/2$^+$)	1186.87	5/2$^-$				
1637.3[&] *1*	100.0 *35*	1637.32	(9/2$^+$)	0.0	9/2$^+$	(M1+E2)	−0.53 *+12−16*	0.000387 *6*	α=0.000387 *6*; α(K)=0.000233 *4*; α(L)=2.55×10^{-5} *4*; α(M)=4.49×10^{-6} *7*; α(N+..)=0.000124 *3* α(N)=6.59×10^{-7} *10*; α(O)=3.89×10^{-8} *6*; α(IPF)=0.000123 *3*
1740.4[&] *2*	4.1 *2*	1845.03	(5/2)$^-$	104.61	1/2$^-$				
1790.82 *24*	9.1 *5*	1790.84	(9/2$^-$)	0.0	9/2$^+$	(E1+M2)	−0.15 *15*	0.000578 *9*	α=0.000578 *9*; α(K)=0.000106 *18*; α(L)=1.15×10^{-5} *20*; α(M)=2.0×10^{-6} *4*; α(N+..)=0.000459 *24* α(N)=3.0×10^{-7} *5*; α(O)=1.7×10^{-8} *3*; α(IPF)=0.000458 *24*
2530.8 *4*	1.3 *4*	2530.8	(11/2$^-$)	0.0	9/2$^+$	(E1+M2)	+0.22 *3*	0.001010 *16*	α=0.001010 *16*; α(K)=6.49×10^{-5} *18*; α(L)=7.03×10^{-6} *20*; α(M)=1.23×10^{-6} *4*; α(N+..)=0.000937 *16* α(N)=1.81×10^{-7} *6*; α(O)=1.07×10^{-8} *3*; α(IPF)=0.000937 *16*
2631.9 *3*	35.9 *10*	2632.16	(9/2)	0.0	9/2$^+$				
2792.0 *3*	3.0 *3*	2792.39	(7/2$^+$)	0.0	9/2$^+$				
3028.5 *3*	25.8 *10*	3028.65	7/2,9/2,11/2$^{(+)}$	0.0	9/2$^+$				

γ(^{91}Nb) (continued)

E_γ ‡	I_γ #a	E_i(level)	J_i^π	E_f	J_f^π
3149.2 *4*	16.7 *9*	3149.3	7/2,9/2,11/2	0.0	9/2$^+$
3187.8 *5*	1.6 *2*	3187.9	7/2,9/2,11/2	0.0	9/2$^+$
3837.6 *6*	0.9 *2*	3837.7	(7/2,9/2$^-$)	0.0	9/2$^+$
3886.7 *6*	0.7 *2*	3886.8	7/2,9/2,11/2$^{(-)}$	0.0	9/2$^+$
3916.7 *6*	0.5 *2*	3916.8	7/2,9/2,11/2	0.0	9/2$^+$
4180.6 *11*	0.6 *2*	4180.7	7/2,9/2,11/2	0.0	9/2$^+$

† Additional information 1.
‡ Weighted average from 1976De37 and 1970He03, except as noted. γ′s of 1970He03 which are not seen by 1976De37 (Iγ<1 in 1976De37) are not adopted. The energies measured by 1970De34 are systematically lower by≈1 keV.
# From 1976De37. The values from 1970He03 are less precise but agree with 1976De37 within the uncertainty limits, except as noted.
@ From Adopted Gammas.
& From 1976De37.
a For absolute intensity per 100 decays, multiply by 0.00329 *17*.
b Placement of transition in the level scheme is uncertain.

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays