^{93}Mo IT decay 2009Ho07,1977Me03

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 112, 1163 (2011)	15-Dec-2010

Parent: ^{93}Mo: E=2424.97 *4*; $J^{\pi}=21/2^{+}$; $T_{1/2}$=6.85 h *7*; %IT decay=99.8832 *24*

^{93}Mo-%IT decay: From I(949γ in Nb)/(I(1363γ+1477γ) in Mo)=0.0012 *1* (1977Me03) and (I(950γ)+I(1363γ)+I(1477γ))=100%.

Others: 1951Ru24, 1953Al02, 1953Fo12, 1953Kr52, 1965Gr29, 1966Al17, 1971Na03, 1974An24, 1974Ch12, 1976Be34, 1985Su04.

1977Me03: thin Ge(Li) detector for Eγ<400, Compton suppressed Ge(Li) spectrometers; measured Eγ, Iγ.

1974Ch12: Ge(Li) and Si(Li) detectors; measured Eγ, Iγ, α(K)exp (renormalized here so α(K)exp(263γ)=0.51 (E4 theory)).

2009Ho07: 6.85 h ^{93}Mo obtained from 7.4 MeV/nucleon $^{86}Kr^{21+}$ bombardment of 99% enriched ^{13}C target; fragment separator; evaporation residues implanted In Pb foil; prompt γ-rays eliminated by 520 ns flight time; 14 HPGe detectors surrounding Pb foil (2 with BGO anti-Compton shields, 3 operated As low-energy photon spectrometers) At θ=30°, 52°, 90°, 128° and 150°; measured Eγ, Iγ, $\gamma\gamma$ coin (250 ns time Γ); jj-coupling shell model calculations.

^{93}Mo Levels

E(level)†	J^{π}‡	$T_{1/2}$	Comments
0.0	$5/2^{+}$		
1363.068 *16*	$7/2^{+}$		
1477.150 *3*	$9/2^{+}$	≤14 ps	$T_{1/2}$: from 684γ-1477γ delayed coin (1976Be34).
2161.846 *22*	$13/2^{+}$	46 ps *6*	$T_{1/2}$: from 263γ-684γ delayed coin (1976Be34).
2304.1?	$(11/2)^{-}$		E(level): from Adopted Levels.
2424.895 *25*	$21/2^{+}$	6.85 h *7*	%IT=99.88 *1*; %ε+%β^{+}=0.12 *1* $T_{1/2}$: weighted average of 6.75 h *5* (1950Ku15), 6.95 h *5* (1952Bo62), and 6.85 h *10* (1965Gr29).

† From least-squares fit to Eγ adopted here.

‡ From Adopted Levels.

γ(^{93}Mo)

Iγ normalization: From Σ(I(γ+ce) to g.s.)=100% of IT decays.
γγ coin data are from 1966Al17. For γγ(θ), see 1953Kr52.

E_γ[†]	I_γ[‡@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[&]	Comments
114.045 *21*	0.68 *2*	1477.150	9/2$^+$	1363.068	7/2$^+$	M1+(E2)	<0.11	0.178 *5*	α(K)exp=0.29 *15* (1974Ch12) α(K)=0.155 *4*; α(L)=0.0186 *7*; α(M)=0.00334 *11*; α(N+..)=0.000533 *17* α(N)=0.000505 *16*; α(O)=2.75×10^{-5} *6* E_γ: unweighted average of 114.065 *5* (2009Ho07) and 114.024 *9* (1977Me03). Mult.,δ: from α(K)exp (1974Ch12). %Iγ=99.074 *23* assuming adopted decay scheme normalization.
263.049 *13*	57.5 *11*	2424.895	21/2$^+$	2161.846	13/2$^+$	E4		0.698	α(exp)=0.687 *17* (1989ViZT) α(K)=0.517 *8*; α(L)=0.1488 *21*; α(M)=0.0277 *4*; α(N+..)=0.00390 *6* α(N)=0.00382 *6*; α(O)=7.97×10^{-5} *12* E_γ: unweighted average of 263.036 *1* (2009Ho07) and 263.062 *5* (1977Me03). Mult.: from α(exp)=0.687 *17* (1989ViZY). other α(exp): 0.71 *4*, weighted average of 0.72 *5* (1963Bo29) and 0.70 *5* (1985Su04; based on intensity balance at the 2162 level, assuming E2-theory value for α(685 transition)). Supported by K/L=3.5 *2* (1965Gr29); other K/L: 3.09 *6* (1953Fo12), 2.79 *15* (1953Al02), 2.9 *2* (1951Ru24).
684.693 *21*	100.0 *8*	2161.846	13/2$^+$	1477.150	9/2$^+$	E2		0.00196 *3*	α(K)exp=0.00153 *24* (1953Fo12) α=0.00196 *3*; α(K)=0.001721 *24*; α(L)=0.000200 *3*; α(M)=3.58×10^{-5} *5*; α(N+..)=5.70×10^{-6} *8* α(N)=5.41×10^{-6} *8*; α(O)=2.93×10^{-7} *5* E_γ: unweighted average of 684.714 *1* (2009Ho07) and 684.672 *9* (1977Me03). Mult.: from α(K)exp=0.00153 *24*, the weighted average of 0.0017 *4* (1974Ch12) and 0.00144 *29* (1953Fo12, renormalized so α(K)(263)=0.517). Supported by K/L=8.0 *10* (1953Fo12). δ(Q,O)<0.07 from α(K)exp.
827[#a]	<0.005[#]	2304.1?	(11/2)$^-$	1477.150	9/2$^+$	(E1+M2)		0.0018 *14*	α=0.0018 *14*; α(K)=0.0016 *12*; α(L)=0.00018 *14*; α(M)=3.3×10^{-5} *25*; α(N+..)=5.E−6 *4* α(N)=5.E−6 *4*; α(O)=2.8×10^{-7} *21* Mult.: from Adopted Gammas.
947.8[#a]	≤0.22[#]	2424.895	21/2$^+$	1477.150	9/2$^+$				E_γ: γ unconfirmed In other studies so omitted from Adopted Gammas.

$^{93}_{42}$Mo$_{51}$-2

^{93}Mo IT decay 2009Ho07,1977Me03 (continued)

$\gamma(^{93}Mo)$ (continued)

E_γ [†]	I_γ [‡@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α [&]	Comments
1363.016 *22*	0.81 *2*	1363.068	$7/2^+$	0.0	$5/2^+$	M1+E2	+0.48 *−8+6*	0.000449 *7*	α(K)exp=0.00036 *7* α=0.000449 *7*; α(K)=0.000365 *6*; α(L)=4.05×10^{-5} *6*; α(M)=7.22×10^{-6} *11*; α(N+..)=3.64×10^{-5} *7* α(N)=1.102×10^{-6} *16*; α(O)=6.33×10^{-8} *10*; α(IPF)=3.53×10^{-5} *6* E_γ: weighted average of 1363.01 *3* (2009Ho07) and 1363.02 *3* (1977Me03). α(K)exp: weighted average of 0.00039 *10* (1974Ch12) and 0.00032 *10* (1974An24). K/(L+M)=7.4 *14* (1974An24). Mult.,δ: from α(K)exp.
1477.138 *3*	99.2 *11*	1477.150	$9/2^+$	0.0	$5/2^+$	E2		0.000411 *6*	α(K)exp=0.00025 *4* α=0.000411 *6*; α(K)=0.000296 *5*; α(L)=3.30×10^{-5} *5*; α(M)=5.88×10^{-6} *9*; α(N+..)=7.61×10^{-5} *11* α(N)=8.95×10^{-7} *13*; α(O)=5.09×10^{-8} *8*; α(IPF)=7.51×10^{-5} *11* E_γ: weighted average of 1477.138 *2* (2009Ho07) and 1477.113 *20* (1977Me03). Mult.: from α(K)exp=0.00025 *4*, the weighted average of 0.00034 *10* (1974Ch12) and 0.00023 *5* (1953Fo12, renormalized so α(K)(263)=0.517). %Iγ=99.074 *23*.
2161.8[#a]	≤0.10[#]	2161.846	$13/2^+$	0.0	$5/2^+$				E_γ: γ omitted from Adopted Gammas.

[†] High-precision data are reported by 2009Ho07 and 1977Me03 but, for the three lowest-energy lines, the data do not agree within stated uncertainties. the evaluator adopts the unweighted averages of these data, and the weighted average of Eγ for the 1363γ and 1477γ (for which data are consistent).

[‡] Weighted average of Iγ from 2009Ho07 and 1977Me03 after combining the statistical uncertainty in Iγ from 1977Me03 in quadrature with the 2% uncertainty in detector efficiency (see 1977Me03), except As noted. Data from 1974Ch12, 1971Na03 and 1966Al17 are in excellent agreement.

[#] Iγ limit from 1971Na03 renormalized so I(685γ)=100; γ not observed. Eγ from level energy difference. 948γ and 2162γ not included in Adopted Gammas.

[@] For absolute intensity per 100 decays, multiply by 0.998832 *24*.

[&] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[a] Placement of transition in the level scheme is uncertain.

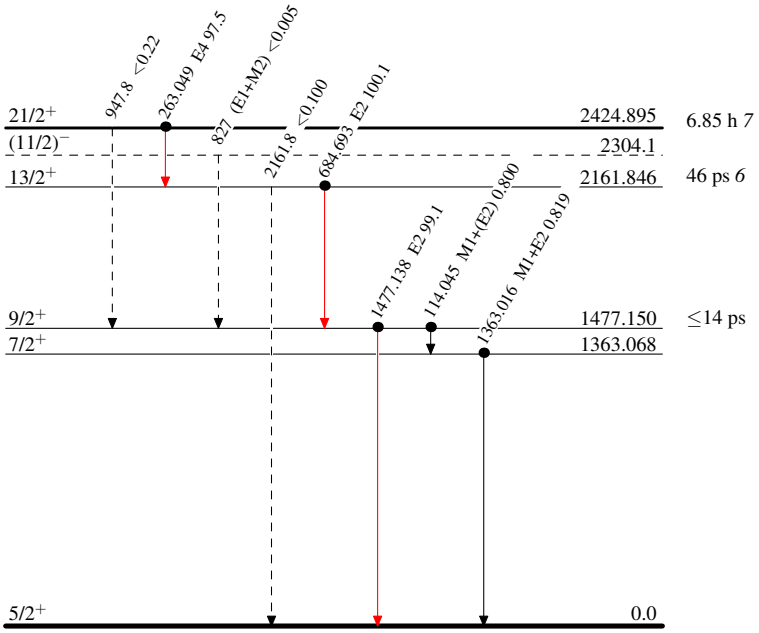
$^{93}_{42}Mo_{51}$-3

^{93}Mo IT decay 2009Ho07,1977Me03

Decay Scheme

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

%IT=99.8832 *24*



$^{93}_{42}Mo_{51}$