^{57}Mn β^- decay 1974Ti01,1969Wa12,1963Va37

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. R. Bhat	NDS 85, 415 (1998)	24-Sep-1998

Parent: ^{57}Mn: E=0.0; J$^{\pi}$=5/2$^-$; $T_{1/2}$=85.4 s *18*; Q(β^-)=2691 *3*; %β^- decay=100.0

^{57}Fe Levels

All data are from 1974Ti01 (Ge(Li)), except as noted.

E(level)†	J$^{\pi}$‡
0.0	1/2$^-$
14.4129‡ *6*	3/2$^-$
136.4761 *22*	5/2$^-$
366.739 *20*	3/2$^-$
706.399 *22*	5/2$^-$
1007.15 *5*	7/2$^-$
(1265.36‡ *11*)	1/2$^-$
1627.30# *5*	3/2$^-$
1725.27 *10*	3/2$^-$

† Calculated using least-squares adjustment procedures; 14.4γ not included in the adjustment.
‡ From Adopted Levels. J^{π} are consistent with those used by 1974Ti01 in deducing J^{π}(^{57}Mn g.s.)=5/2$^-$ on basis of log *ft* arguments.
# 1974Ti01 did not observe the gammas associated with the 1265 and 1359 states in (n,γ). Iβ<0.02.

β^- radiations

1963Va37 assigned Eβ=1100 *100*, Iβ=18 to ^{57}Mn β^- decay. It is extremely doubtful that this assignment is correct since Iβ($\approx$1100β)$\approx$1.5 from decay scheme.

E(decay)	E(level)	Iβ^-†#	Log *ft*	Comments
(966 *3*)	1725.27	0.24 *10*	5.5 *2*	av Eβ=351 *2*
(1064 *3*)	1627.30	1.1 *5*	5.0 *2*	av Eβ=393 *2*
(1684 *3*)	1007.15	0.40 *16*	6.3 *2*	av Eβ=670 *2*
(1985 *3*)	706.399	6.3 *24*	5.4 *2*	av Eβ=809 *2*
(2324 *3*)	366.739	2.2 *9*	6.1 *2*	av Eβ=968 *2*
2.40×10^3‡ *10*	136.4761	15 *6*	5.4 *2*	av Eβ=1077 *2* E(decay): from $\beta\gamma$ (1969Wa12; NaI,scin).
2550‡ *50*	14.4129	75 *7*	4.83 *4*	av Eβ=1135 *2* E(decay): from 1963Va37 (magnetic spect). Placement suggested by 1969Wa12. Possibility of contamination in the spectra of 1963Va37; see comment above. Iβ^-: other: 82 (1963Va37).

† Based on decay scheme presented with assumption that there is no direct feeding of the g.s. Δ(γ-normalization) added in quadrature for Iβ to states above 136 keV.
‡ If present placement is correct, Eβ's are discrepant with adopted Q(β^-).
# Absolute intensity per 100 decays.

$\gamma(^{57}Fe)$

Iγ normalization: from ΣIγ(122γ,136γ)=16.5% *64* based on $\beta\gamma$-coincidence data (1969Wa12) indicating that 83.5% *64* of the total β^- decay does not go through the 122 and 136 gammas. Note that Eβ's and placement based $\beta\gamma$-coincidence data are discrepant with Q(β^-) indicating a possible problem in normalization.

All data are from 1974Ti01 (Ge(Li)), except as noted.

α(K), α(L): Additional information 2.

E_γ	I_γ[‡d]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[†]	δ[†]	α[#]	$I_{(\gamma+ce)}$[e]	Comments
(14.4129 *6*)	1.92×10^3 *3*	14.4129	3/2$^-$	0.0	1/2$^-$	M1+E2	0.00223 *18*	8.56 *26*	97.0 *11*	ce(K)/(γ+ce)=0.807 *33*; ce(L)/(γ+ce)=0.0855 *41*; ce(M+)/(γ+ce)=0.0117 *10* Additional information 1. E$_\gamma$: from ε decay. I$_\gamma$: from deduced I(γ+ce) and α from adopted gammas; uncertainty given from I(γ+ce) and α only; does not include uncertainty in Iγ normalization. $I_{(\gamma+ce)}$: deduced from decay scheme.
122.063[@] *3*	2.53×10^3 *7*	136.4761	5/2$^-$	14.4129	3/2$^-$	M1+E2	+0.120 *1*	0.0240 *14*		α(K)=0.0214 *12*; α(L)=0.00224 *20*; α(M+..)=0.00037 *5* I$_\gamma$: 1974Ti01 noted that their measurement of Iγ(122γ)/Iγ(136γ)=7.23 *29* agreed with the branching ratio from ε decay (1971Ko19), but differed from that of 1969Wa12, where Iγ(122γ)/Iγ(136γ)=8.70 *8*. The branching ratio in the adopted gammas agrees with 1969Wa12.
136.476[@] *3*	350 *10*	136.4761	5/2$^-$	0.0	1/2$^-$	E2		0.137 *15*		α(K)= 0.134; α(L)=0.0139
230.25 *4*	40 *2*	366.739	3/2$^-$	136.4761	5/2$^-$	(M1+E2)	+0.02 *8*			
339.60 *6*	31 *3*	706.399	5/2$^-$	366.739	3/2$^-$	M1+E2	+0.083 *5*			
352.32 *3*	380 *10*	366.739	3/2$^-$	14.4129	3/2$^-$	M1+E2	+0.025 *9*			
366.73 *4*	72 *5*	366.739	3/2$^-$	0.0	1/2$^-$	M1+E2	−0.45 *5*			
(460.1[&] *4*)	0.14[a] *6*	1725.27	3/2$^-$	1265.36?	1/2$^-$					
569.93 *5*	94 *4*	706.399	5/2$^-$	136.4761	5/2$^-$	M1+E2	+0.097 *8*			I$_\gamma$: other: 74 *11* (1969Wa12).
692.00 *3*	1000 *30*	706.399	5/2$^-$	14.4129	3/2$^-$	M1+E2	−0.465 *8*			
706.42 *6*	43 *2*	706.399	5/2$^-$	0.0	1/2$^-$	[E2]				
870.68 *5*	47 *2*	1007.15	7/2$^-$	136.4761	5/2$^-$	M1+E2	−0.6 *+2−5*			
(898.4[&] *20*)	0.13[b] *6*	(1265.36)	1/2$^-$	366.739	3/2$^-$					
921.03 *11*	17 *2*	1627.30	3/2$^-$	706.399	5/2$^-$					I$_\gamma$: other: 8 *2* (1969Wa12).

$\gamma(^{57}Fe)$ (continued)

E_γ	I_γ[‡d]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]
992.68[c] *8*	26 *2*	1007.15	7/2⁻	14.4129	3/2⁻	E2	
1019.08[c] *20*	8 *1*	1725.27	3/2⁻	706.399	5/2⁻		
(1250.6[&] *22*)	<0.01[b]	(1265.36)	1/2⁻	14.4129	3/2⁻		
1260.54 *8*	59 *3*	1627.30	3/2⁻	366.739	3/2⁻		
(1265.0[&] *22*)	<0.005[b]	(1265.36)	1/2⁻	0.0	1/2⁻		
(1358.71[&] *6*)	4.3[a] *6*	1725.27	3/2⁻	366.739	3/2⁻		
1612.82 *7*	133 *5*	1627.30	3/2⁻	14.4129	3/2⁻	M1+E2	−0.35 *5*
(1710.2[&] *3*)	1.2[a] *3*	1725.27	3/2⁻	14.4129	3/2⁻		
1725.18[c] *11*	30 *2*	1725.27	3/2⁻	0.0	1/2⁻	M1+E2	+0.04 *5*

[†] From adopted gammas.

[‡] Relative to Iγ(692γ)=1000. The ΔIγ given by 1969Wa12 (Ge(Li)) were underestimated (priv.comm. from T. E. Ward to 1974Ti01). Iγ′s from 1969Wa12 and 1974Ti01 agree within uncertainties, except as noted.

[#] From adopted gammas.

[@] Former γ-ray calibration energies from ε decay (1971He20,1972He42). Used as internal calibration points by 1974Ti01. See ε decay for current values.

[&] From adopted gammas. Not observed by 1974Ti01 or 1969Wa12.

[a] From adopted branching ratios and Iγ(1725γ)= 30 *2*.

[b] From adopted branching ratios and Iγ(460γ)= 0.14 *6*.

[c] Not observed by 1969Wa12.

[d] For absolute intensity per 100 decays, multiply by 0.0055 *21*.

[e] Absolute intensity per 100 decays.

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