^{58}Mn β^- decay (65.4 s) 1974Ti01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Caroline D. Nesaraja, Scott D. Geraedts and Balraj Singh	NDS 111, 897 (2010)	12-Jan-2010

Parent: ^{58}Mn: E=71.78 *5*; $J^\pi=4^+$; $T_{1/2}$=65.4 s *5*; Q(β^-)=6250 *30*; %β^- decay=100.0

1974Ti01: E(n)≈14 MeV, ^{58}Fe(n,p). Measured Eγ, Iγ.

1971Dy01: E(n)≈14 MeV, ^{58}Fe(n,p). Measured Eβ, Iβ, Eγ, Iγ.

1969Wa10: E(n)=14.8 MeV, ^{58}Fe(n,p). Measured Eγ, Iγ, β spectra, $\beta\gamma$, $\gamma\gamma$, coincidences, $T_{1/2}$.

1993ScZS (also 1992ScZS): E=11.6 MeV/nucleon, W(^{86}Kr,X), and mass separation. Measured Eγ, Iγ, conversion electron spectra, $T_{1/2}$, $\gamma\gamma$ and $\beta\gamma$ coincidences.

Additional information 1.

The level scheme is from 1974Ti01. The 65.4-S activity is assigned to the 71.78 level as determined by 1993ScZS.

^{58}Fe Levels

E(level)†	J^π‡	E(level)†	J^π‡	E(level)†	J^π‡	E(level)†	J^π‡
0.0	0^+	2600.39 *4*	4^+	3629.57 *24*	2^+	4530.17 *23*	1,2
810.770 *21*	2^+	2876.40 *15*	2^+	3901.61 *7*	$(3)^+$	4590.0 *4*	$(2^+,3,4^+)$
1674.72 *3*	2^+	3083.73 *20*	2^+	4088.47 *17*	4^+	4833.9 *3*	$1^+,2^+$
2076.52 *4*	4^+	3233.26 *6*	2^+	4312.91 *9*	2^+		
2133.89 *4*	3^+	3243.9 *3*	0^+	4493.1 *3*			

† From a least-squares fit to Eγ data.

‡ From 'Adopted Levels'.

β^- radiations

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
$(1.49\times10^3$ *3*)	4833.9	0.106 *10*	6.50 *6*	av Eβ=581 *14*
$(1.73\times10^3$ *3*)	4590.0	0.20 *3*	6.49 *8*	av Eβ=692 *14*
$(1.79\times10^3$ *3*)	4530.17	0.19 *3*	6.57 *8*	av Eβ=719 *14*
$(1.83\times10^3$ *3*)	4493.1	0.92 *6*	5.92 *5*	av Eβ=736 *14*
$(2.01\times10^3$ *3*)	4312.91	2.24 *12*	5.71 *4*	av Eβ=820 *14*
$(2.23\times10^3$ *3*)	4088.47	0.24 *6*	6.87 *12*	av Eβ=925 *15*
$(2.42\times10^3$ *3*)	3901.61	4.25 *25*	5.77 *4*	av Eβ=1013 *15*
$(2.69\times10^3$ *3*)	3629.57	0.92 *6*	6.63 *4*	av Eβ=1142 *15*
$(3.09\times10^3$ *3*)	3233.26	3.24 *17*	6.34 *3*	av Eβ=1331 *15*
$(3.45\times10^3$ *3*)	2876.40	0.158 *19*	7.86 *6*	av Eβ=1503 *15*
$(3.72\times10^3$ *3*)	2600.39	8.0 *4*	6.31 *3*	av Eβ=1636 *15*
$(4.19\times10^3$ *3*)	2133.89	76 *4*	5.56 *3*	av Eβ=1862 *15* E(decay): 3800 *100* (1971Dy01), 3900 *200* (1969Wa10). 1974Ti01 suggest that 5100β observed by 1971Dy01 is in fact ce(K)(810γ)+ce(K)(1323γ)+4000β line.
$(4.25\times10^3$ *3*)	2076.52	3.8 *4*	6.88 *5*	av Eβ=1890 *15*

† From Iγ balance at each level.

‡ Absolute intensity per 100 decays.

^{58}Mn β^- decay (65.4 s) 1974Ti01 (continued)

$\gamma(^{58}Fe)$

Iγ normalization: Σ(I(γ+ce) of γ's to g.s.)=100; assuming that g.s. β^- feeding is zero.

E_γ[†]	I_γ[#a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	Comments
458.5[&c]		4088.47	4^+	3629.57	2^+			I_γ: weak G.
459.160 *25*	24.3 *7*	2133.89	3^+	1674.72	2^+	(M1)		
466.48 *3*	1.44 *5*	2600.39	4^+	2133.89	3^+	(M1)		
523.86 *3*	4.20 *13*	2600.39	4^+	2076.52	4^+	M1+E2	−0.15 *5*	
632.71 *10*	0.64 *6*	3233.26	2^+	2600.39	4^+			
810.761 *21*	100 *3*	810.770	2^+	0.0	0^+	E2		Calibration energy. See 1974Ti01. Note that from ^{58}Co decay, this energy is 810.7593 *29* (2000He14 evaluation).
863.94 *3*	16.8 *5*	1674.72	2^+	810.770	2^+	M1+E2	−0.69 *5*	
925.68 *5*	1.91 *7*	2600.39	4^+	1674.72	2^+	E2		
1156.77 *7*	1.19 *5*	3233.26	2^+	2076.52	4^+			
1265.74 *5*	10.3 *3*	2076.52	4^+	810.770	2^+	E2		
1301.10 *11*	0.78 *4*	3901.61	$(3)^+$	2600.39	4^+			
1323.09 *5*	67.3 *20*	2133.89	3^+	810.770	2^+	M1+E2	−0.40 *5*	
1436.5[@c]	≤0.04[@]	4312.91	2^+	2876.40	2^+			
1446.5 *3*	0.11 *2*	4530.17	1,2	3083.73	2^+			
1488.17 *20*	0.18 *4*	4088.47	4^+	2600.39	4^+			
1558.71 *19*	0.58 *2*	3233.26	2^+	1674.72	2^+			
1674.72 *7*	13.2 *4*	1674.72	2^+	0.0	0^+	E2		
1712.2 *3*	0.08 *3*	4312.91	2^+	2600.39	4^+			
1767.74 *8*	3.60 *15*	3901.61	$(3)^+$	2133.89	3^+			
1789.59 *8*	3.25 *10*	2600.39	4^+	810.770	2^+	E2		
1825.1[@c]	≤0.04[@]	3901.61	$(3)^+$	2076.52	4^+			E_γ: 1829.6 listed In level-scheme figure of 1974Ti01 seems incorrect.
2011.7 *3*	<0.18	4088.47	4^+	2076.52	4^+			I_γ: complex peak containing a small contribution from an impurity G.
2065.59 *14*	0.18 *2*	2876.40	2^+	810.770	2^+	M1+E2	−0.33 *+8−11*	
2179.08 *14*	0.54 *4*	4312.91	2^+	2133.89	3^+			
2226.88 *18*	0.34 *8*	3901.61	$(3)^+$	1674.72	2^+			
2236.33 *15*	0.39 *2*	4312.91	2^+	2076.52	4^+			
2272.99 *23*	0.09 *2*	3083.73	2^+	810.770	2^+	M1+E2	−0.05 *1*	
2422.45 *17*	1.27 *3*	3233.26	2^+	810.770	2^+			
2433.05 *25*	0.14 *2*	3243.9	0^+	810.770	2^+			
2513.9[&c] *4*	0.06 *2*	4590.0	$(2^+,3,4^+)$	2076.52	4^+			
2638.15 *20*	1.51 *4*	4312.91	2^+	1674.72	2^+			
2699.94 *25*	0.12 *1*	4833.9	$1^+,2^+$	2133.89	3^+			
2818.5[b] *3*	0.96[b] *3*	3629.57	2^+	810.770	2^+			
2818.5[b] *3*	0.96[b] *3*	4493.1		1674.72	2^+			
2855.2 *3*	0.07 *1*	4530.17	1,2	1674.72	2^+			
2876.3[@c]	≤0.03[@]	2876.40	2^+	0.0	0^+			
3083.6[@c]	≤0.03[@]	3083.73	2^+	0.0	0^+			
3090.7 *4*	0.11 *2*	3901.61	$(3)^+$	810.770	2^+			
3233.2[@c]	≤0.03[@]	3233.26	2^+	0.0	0^+			
3501.9 *8*	0.02 *2*	4312.91	2^+	810.770	2^+			
3629.8 *4*	0.08 *2*	3629.57	2^+	0.0	0^+			
3681.7 *5*	0.08 *2*	4493.1		810.770	2^+			
3778.1 *6*	0.17 *2*	4590.0	$(2^+,3,4^+)$	810.770	2^+			
3901.5[@c]	<0.02[@]	3901.61	$(3)^+$	0.0	0^+			

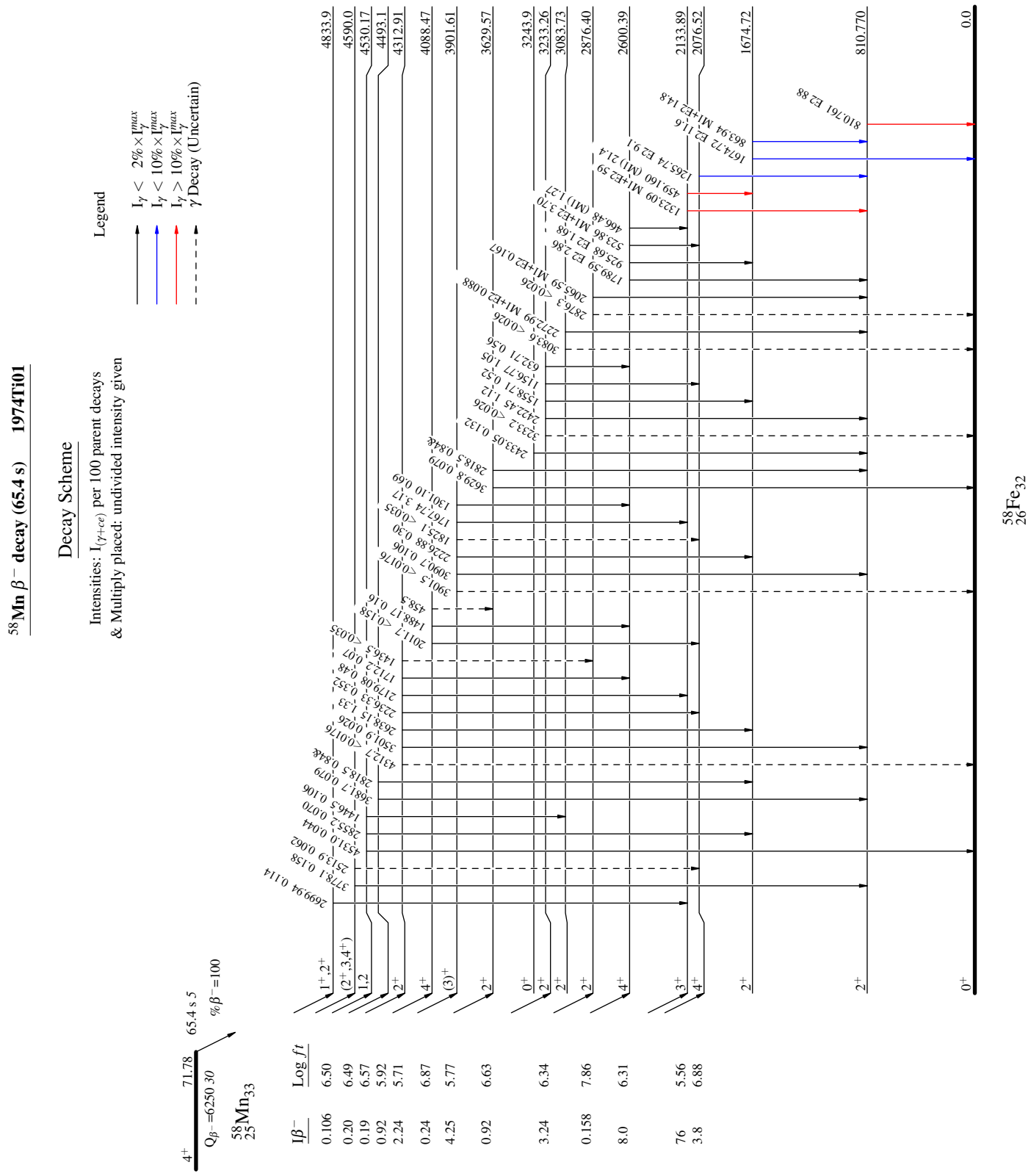
Continued on next page (footnotes at end of table)

^{58}Mn β^- decay (65.4 s) 1974Ti01 (continued)

$\gamma(^{58}Fe)$ (continued)

E_γ [†]	I_γ [#a]	E_i(level)	J_i^π	E_f	J_f^π
4312.7[@c]	<0.02[@]	4312.91	2^+	0.0	0^+
4531.0 *15*	0.04 *2*	4530.17	1,2	0.0	0^+

† From 1974Ti01.
‡ From 'adopted gammas'.
# Values are from 1974Ti01, divided by 100 by the evaluators.
@ γ not observed In 1974Ti01, an upper limit of intensity is given.
& Existence of this γ is uncertain.
a For absolute intensity per 100 decays, multiply by 0.88 *4*.
b Multiply placed with undivided intensity.
c Placement of transition in the level scheme is uncertain.


58Mn β− decay (65.4 s) 1974Ti01
Decay Scheme
Intensities: I(γ+ce) per 100 parent decays
& Multiply placed: undivided intensity given
Legend
Iγ < 2%×Iγmax
Iγ < 10%×Iγmax
Iγ > 10%×Iγmax
γ Decay (Uncertain)
4+ 71.78 65.4 s 5
Qβ− =6250 30 %β− =100
58 25Mn33
Iβ− Log ft
0.106 6.50
0.20 6.49
0.19 6.57
0.92 5.92
2.24 5.71
0.24 6.87
4.25 5.77
0.92 6.63
3.24 6.34
0.158 7.86
8.0 6.31
76 5.56
3.8 6.88
1+,2+
(2+,3,4+)
1,2
2+
4+
(3)+
2+
0+
2+
2+
2+
4+
3+
4+
2+
2+
0+
4833.9
4590.0
4530.17
4493.1
4312.91
4088.47
3901.61
3629.57
3243.9
3233.26
3083.73
2876.40
2600.39
2133.89
2076.52
1674.72
810.770
0.0
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