^{55}Mn(α,pγ) 1977Ca28,1978Bo35

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

1978Bo35: Eα=10 MeV, measured Eγ, pγ coin and lifetimes by DSAM.
Additional information 1.
1977Ca28: Eα=12-24 MeV, measured excitation functions for γ-rays, Eγ, Iγ, $\gamma\gamma$ coin, $\gamma(\theta)$, lifetimes by DSAM, $\gamma\gamma(\theta)$(DCO).
1988Yu01: Eα=25.7 MeV, measured σ(E,θ).

^{58}Fe Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[@]	Comments
0.0	0^+		
810.77 *5*	2^+[#]	2.4 ps *+7−6*	$T_{1/2}$: 6.54 ps *19* is the 'adopted' value. See Adopted Levels, Gammas dataset.
1674.75 *13*	2^+[#]	1.6 ps *4*	
2076.70 *9*	4^+[#]	0.37 ps *+6−5*	$T_{1/2}$: other: 0.24 ps *7* (1977Ca28).
2134.19 *10*	3^+[#]	2.2 ps *7*	
2257.87 *22*	0^+	>2.5 ps	
2600.46 *10*	4^+	0.37[&] ps *+12−7*	J=4 from DCO. $T_{1/2}$: other: 0.73 ps *14* (1978Bo35) is In disagreement.
2781.95 *22*	1^+	0.18 ps *+3−2*	
2876.5 *3*	2^+	0.094 ps *14*	
3083.75 *22*	2^+	0.025 ps *+6−4*	
3233.28 *6*	2^+	0.22 ps *5*	E(level): from 'Adopted Levels'.
3243.99 *23*	0^+		E(level): from 'Adopted Levels'.
3450.0 *3*	(4^+)	0.36 ps *+13−8*	J=4 or 5 from $\gamma(\theta)$.
3537.97 *16*	1^+	0.006 ps *3*	
3597.53 *17*	6^+	0.15 ps *+3−2*	$T_{1/2}$: other: 0.34 ps *4* (1977Ca28) is In disagreement. J^π: J=3,4,6 from DCO; 1520$\gamma(\theta)$ stretched Q to 4^+ gives J=6.
3630.60 *17*	2^+	0.006 ps *2*	
3754.4 *4*	$(4)^+$	<0.013 ps	
3789.66 *19*	(5^-)	0.026 ps *+6−4*	
3881.5 *8*	1^+	<0.004 ps	
3886.91 *22*	6^+	0.47 ps *+17−10*	J=4 or 6 from $\gamma(\theta)$; J=4 can be rejected from the excitation functions of 289γ and 1752γ. $T_{1/2}$: other: 0.49 ps *+15−7* (1977Ca28).
4015.0 *3*	1^+	0.008 ps *+4−3*	
4139.3 *3*	1^+	<0.0007 ps	
4213.3 *4*	(5^+)	0.45 ps *+14−10*	J=5 from $\gamma(\theta)$.
4669.3 *6*	(7^+)	0.38[&] ps *+12−6*	J=5,6 or 7 from $\gamma(\theta)$; J=5 or 6 ruled out from the large δ required for these J assignments and RUL.
5341.3 *7*	8^+	0.42[&] ps *+10−8*	J=8 from $\gamma(\theta)$.
5502.6 *11*	(8^+)		
5830.6 *12*	(9^+)	0.40[&] ps *+15−4*	J=8 or 9 from $\gamma(\theta)$; J=9 favored from band structure.

[†] From a least-squares fit to Eγ data with energies of the 3233 and 3244 levels held fixed at their adopted values.
[‡] From 'Adopted Levels'; supporting arguments from 1977Ca28 are given in comments.
[#] Consistent with DCO and $\gamma(\theta)$ of 1977Ca28.
[@] From DSAM, values are from 1978Bo35, except where noted otherwise.
[&] From 1977Ca28.

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$\gamma(^{58}Fe)$

A_2, A_4 are measured at E(α)=17 MeV and DCO′s (gated on ΔJ=2, E2) At 20 MeV (1977Ca28).

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	Comments
810.77	2^+	810.76 *5*		0.0	0^+			
1674.75	2^+	863.94	58 *9*	810.77	2^+			
		1674.67	42 *7*	0.0	0^+			
2076.70	4^+	1265.92 *8*		810.77	2^+	E2		Mult.: A_2=+0.31 *3*, A_4=−0.07 *4*. DCO=0.97 *3*.
2134.19	3^+	459.76 *21*	33 *5*	1674.75	2^+			
		1323.34 *10*	67 *10*	810.77	2^+	M1+E2	−2.5	Mult.: A_2=−0.29 *11*, A_4=+0.09 *9*. DCO=1.80 *20*.
2257.87	0^+	1447.31 *25*		810.77	2^+			
2600.46	4^+	466.33 *24*	13 *2*	2134.19	3^+			
		523.75 *8*	35 *5*	2076.70	4^+	E2+M1	+6.3	DCO=1.18 *10*, 1.57 *13*.
		925.74 *12*	9 *4*	1674.75	2^+	E2		Mult.: A_2=+0.43 *5*, A_4=−0.07 *7*.
		1789.58 *20*	43 *7*	810.77	2^+	E2		Mult.: A_2=+0.33 *5*, A_4=−0.10 *6*. DCO=0.92 *10*.
2781.95	1^+	524.4 *3*		2257.87	0^+			
		1106.7 *3*		1674.75	2^+			
		1971.6 *5*		810.77	2^+			
		2781.9 *9*		0.0	0^+			
2876.5	2^+	2065.70 *26*		810.77	2^+			
3083.75	2^+	2272.94 *21*		810.77	2^+			
3233.28	2^+	632.7 *4*		2600.46	4^+			
		1156.6 *3*		2076.70	4^+			
		1557 *2*		1674.75	2^+			
		2422.51[a] *8*		810.77	2^+			
3243.99	0^+	2433.22[a] *23*		810.77	2^+			
3450.0	(4^+)	849.7 *4*	69 *11*	2600.46	4^+			
		1315.6 *4*	31 *5*	2134.19	3^+	(M1+E2)	+3.9	DCO=1.0 *3*, 0.40 *20*; the latter with gate on ΔJ=1 G. E_γ: authors′ ΔEγ=0.04 seems a misprint.
		1373[&]		2076.70	4^+			I_γ: very weak.
3537.97	1^+	1862.2 *5*		1674.75	2^+			
		2727.24 *16*		810.77	2^+			
3597.53	6^+	1520.69 *15*		2076.70	4^+	E2		Mult.: A_2=+0.30 *8*, A_4=−0.10 *10*. DCO=1.10 *10*.
3630.60	2^+	2819.76 *16*		810.77	2^+			
3754.4	$(4)^+$	1677.7 *4*		2076.70	4^+			
3789.66	(5^-)	1712.94 *17*		2076.70	4^+			
3881.5	1^+	3881.4 *8*		0.0	0^+			
3886.91	6^+	289.19 *20*	31	3597.53	6^+			
		437[&]	≈5	3450.0	(4^+)			
		1286[&]	≈8	2600.46	4^+			
		1811.1 *4*	56	2076.70	4^+	E2		Mult.: A_2=+0.27 *6*, A_4=−0.08 *5*. DCO=0.90 *10*, 1.00 *10*.
4015.0	1^+	3204.10 *26*		810.77	2^+			
4139.3	1^+	4139.1 *3*		0.0	0^+			
4213.3	(5^+)	1612.8 *3*		2600.46	4^+	D(+Q)	−0.04	Mult.: A_2=−0.35 *8*, A_4=+0.05 *5*. DCO=1.90 *10*, 2.0 *5*.
4669.3	(7^+)	782.2 *11*	67 *10*	3886.91	6^+	D(+Q)	−0.06 *+16−10*	Additional information 2. Mult.: A_2=+0.09 *3*, A_4=+0.15 *8*.
		1072.2	33 *10*	3597.53	6^+	D(+Q)	−0.10 *+20−15*	DCO=3.0 *8*.

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^{55}Mn(α,pγ) 1977Ca28,1978Bo35 (continued)

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

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	Comments
4669.3	(7^+)	1219		3450.0	(4^+)		I_γ: very weak.
5341.3	8^+	672	≈13	4669.3	(7^+)		
		1455.0	46 *15*	3886.91	6^+	(E2)	DCO=1.10 *15*, 1.00 *10*.
		1743	41 *15*	3597.53	6^+		
5502.6	(8^+)	1905		3597.53	6^+		
5830.6	(9^+)	1161.3		4669.3	(7^+)	(E2)	DCO=1.22 *24*, 1.0 *4*.

† From 1978Bo35, except where noted otherwise.
‡ Branching ratios from each level (1977Ca28).
# From $\gamma(\theta)$ and $\gamma\gamma(\theta)$; RUL used when level lifetime is known.
@ From 1977Ca28.
& From 1977Ca28.
a The transitions to 811 level from the 3233 and 3244 levels were not resolved and their energies were derived from level energy differences.

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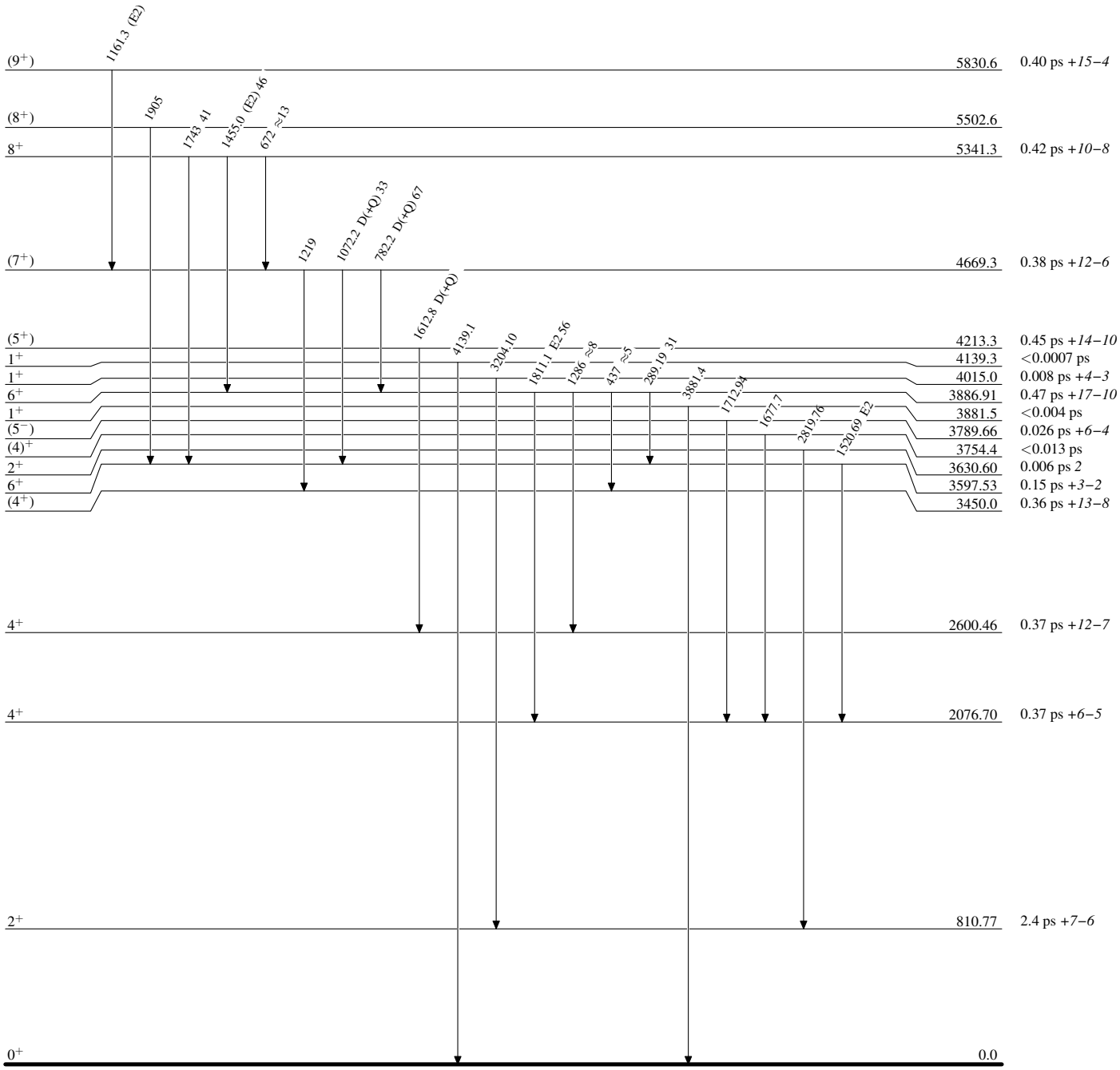
Level Scheme

Intensities: % photon branching from each level

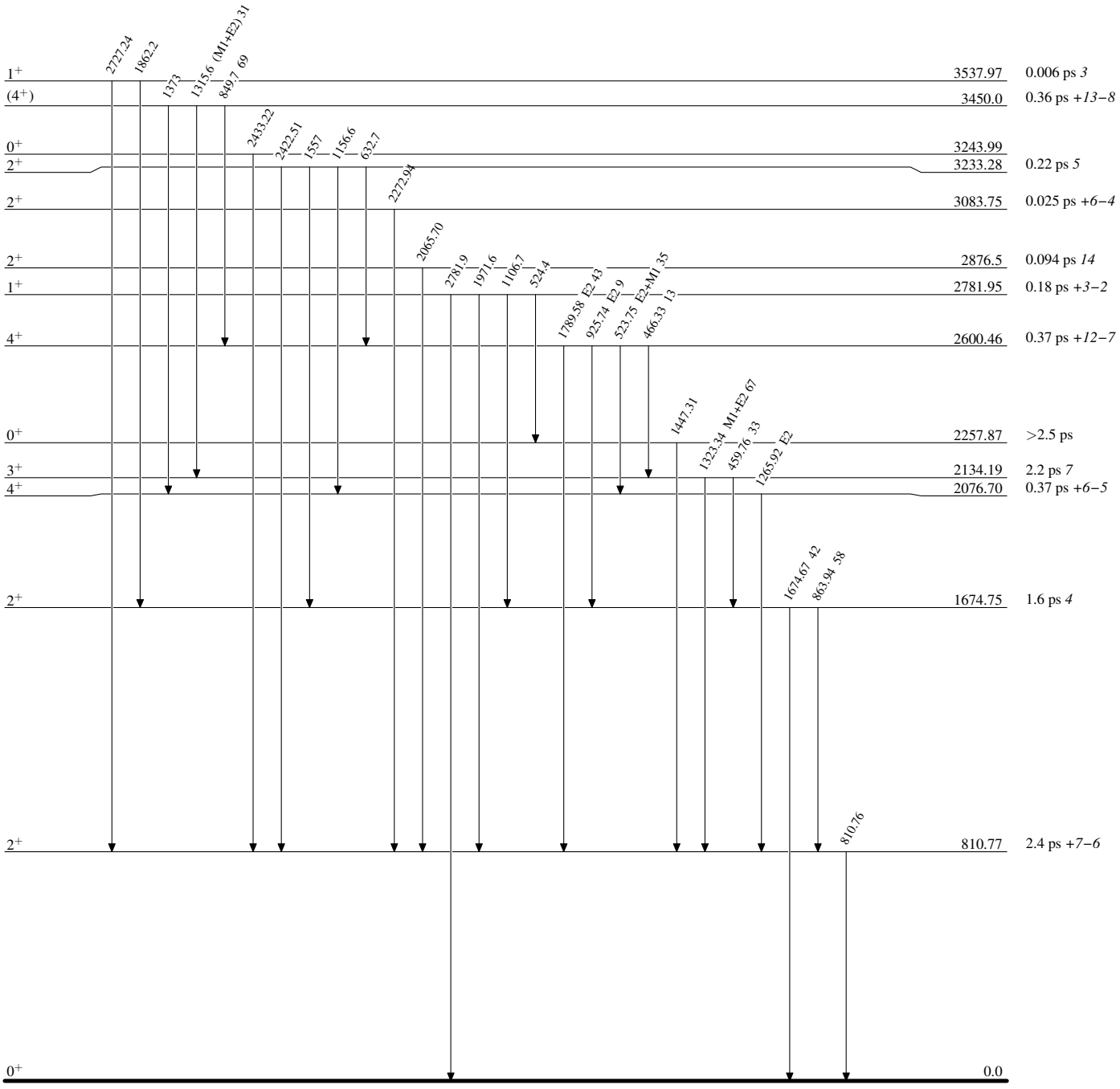


$^{58}_{26}Fe_{32}$

^{55}Mn(α,pγ) 1977Ca28,1978Bo35

Level Scheme (continued)

Intensities: % photon branching from each level



$^{58}_{26}Fe_{32}$