^{54}Fe(p,$\alpha\gamma$) 1977No01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Wang Jimin and Huang Xiaolong	NDS 144, 1 (2017)	1-Mar-2016

E=9-13.2 MeV; measured σ(E(p),Eα), Eγ, Iγ, DSA, $\alpha\gamma(\theta)$, and $\gamma\gamma(\theta)$.

^{51}Mn Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[a]	Comments
0.0	5/2$^-$[&]		
237.3	7/2$^-$	>0.7 ps	
1139.8	(9/2)$^-$[#]	0.25 ps +*8*−*6*	
1488	(11/2)$^-$[#]	0.50 ps +*14*−*10*	
1817.1	(3/2$^-$)	>0.7 ps	
1824.6	3/2$^-$	35 fs +*13*−*10*	
1959.1	(1/2)$^-$	0.26 ps +*10*−*7*	
2140.4	(3/2)$^-$	39 fs +*17*−*15*	
2255.7	(5/2$^-$)[&]	79 fs +*33*−*26*	
2275.9	(1/2$^+$)	>1.2 ps	$T_{1/2}$: <3.5 ns from $\alpha\gamma$(t) measurement.
2310.0	(5/2)	0.9 ps +*6*−*4*	
2415.9	7/2$^-$[@]	28 fs +*15*−*13*	
2701.6	(3/2)	>0.5 ps	$T_{1/2}$: <3.5 ns from $\alpha\gamma$(t) measurement.
2841.4	(1/2)$^-$	0.27 ps +*13*−*8*	
2914	(3/2)$^-$	<21 fs	
2983.5	(5/2)		

[†] E=1817+1825 is an unresolved doublet; E(level) values are from Adopted Levels.
[‡] Based on $\gamma\gamma(\theta)$, γ mult, δ, and decay pattern, except as noted.
[#] $\gamma(\theta)$ for the 1251γ favors J(1488)=11/2 and mult(1251γ)=Q, but cannot exclude J=7/2 with $\delta\approx$1.2. J=1/2,3/2, 5/2 and 9/2 are all definitely excluded. $\gamma(\theta)$ for the 348γ to 1139 is consistent with J(1488):J(1140)=7/2:5/2, 7/2:9/2, or 11/2:9/2. $\gamma(\theta)$ for the 903γ is consistent with J(1139)=5/2,7/2, or 9/2. Model-dependent arguments strongly favor J=11/2 over 7/2 for the 1488 level, and thus J(1139)=9/2.
[@] $\gamma(\theta)$ for the 1276γ to 1139 rules out J(2415)=5/2 and is consistent with 7/2 if J(1139)=9/2.
[&] From Adopted Levels.
[a] From DSA measurements in 1977No01, except as noted.

γ(^{51}Mn)

E_i(level)	J^π_i	E_γ	I_γ[†]	E_f	J^π_f	Mult.[a]	δ[@]	Comments
237.3	7/2$^-$	237	100	0.0	5/2$^-$	(M1+E2)	+0.100 *11*	$\gamma(\theta)$: A_2=−0.11 *6*, A_4=+0.05 *8*.
1139.8	(9/2)$^-$	903	86 *2*	237.3	7/2$^-$	(M1+E2)	+0.323 *22*	$\gamma(\theta)$: A_2=+0.17 *11*, A_4=−0.11 *15*.
		1140	14 *2*	0.0	5/2$^-$	(E2)		$\gamma(\theta)$: A_2=+0.60 *29*, A_4=+0.10 *41*.
1488	(11/2)$^-$	348	36 *4*	1139.8	(9/2)$^-$	(M1+E2)	+0.054 *27*	$\gamma(\theta)$: A_2=−0.29 *5*, A_4=−0.04 *8*.
		1251	64 *4*	237.3	7/2$^-$	(E2)		$\gamma(\theta)$: A_2=+0.23 *13*, A_4=−0.30 *18*.
		1488	<2	0.0	5/2$^-$			
1817.1	(3/2$^-$)	1580	[‡]	237.3	7/2$^-$	(E2)		
		1817	[‡]	0.0	5/2$^-$	(M1)		
1824.6	3/2$^-$	1588	[‡]	237.3	7/2$^-$	(E2)		
		1825	94[‡]	0.0	5/2$^-$	(M1)		
1959.1	(1/2)$^-$	1721	<2	237.3	7/2$^-$			
		1959	>98	0.0	5/2$^-$	(E2)		

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^{54}Fe(p,$\alpha\gamma$) 1977No01 (continued)

γ(^{51}Mn) (continued)

E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	Mult.[a]	δ[@]	Comments
2140.4	(3/2)$^-$	1903	2 *1*	237.3	7/2$^-$	(E2)		
		2140	98 *1*	0.0	5/2$^-$	(M1+E2)	−0.08 *7*	
2255.7	(5/2$^-$)	2019		237.3	7/2$^-$			
		2256		0.0	5/2$^-$			
2275.9	(1/2$^+$)	317	22 *3*	1959.1	(1/2)$^-$	(E1)		
		459	78 *3*	1817.1	(3/2$^-$)	(E1)		
2310.0	(5/2)	2073	85 *3*	237.3	7/2$^-$	D(+Q)		δ: +0.03 *4* or −8.4 *+20−30*.
		2310	15 *3*	0.0	5/2$^-$	D(+Q)		δ: +0.06 *13* or +1.4 *3*.
2415.9	7/2$^-$	1276	40 *3*	1139.8	(9/2)$^-$	(M1(+E2))	0.0 *1*	
		2179	60 *3*	237.3	7/2$^-$	(M1+E2)	−0.18 *16*	
		2416	<5	0.0	5/2$^-$	(M1)		
2701.6	(3/2)	392	44 *4*	2310.0	(5/2)	D(+Q)		δ: −0.11 *12* or −3.1 *+10−16*.
		743	33 *4*	1959.1	(1/2)$^-$	D(+Q)		δ: +0.08 *8* or −2.1 *4*.
		884.5	<26[#]	1817.1	(3/2$^-$)			
2841.4	(1/2)$^-$	887.5	>70[#]	1959.1	(1/2)$^-$	(M1)		
		1016	<30	1824.6	3/2$^-$	(M1)		
2914	(3/2)$^-$	2914	100	0.0	5/2$^-$	(M1)		
2983.5	(5/2)	2748	69 *5*	237.3	7/2$^-$	D(+Q)	+0.04[&] *8*	
		2985	31 *5*	0.0	5/2$^-$	D(+Q)	−0.37[&] *21*	

† % photon branching from each level.

‡ The 1817+1825 doublet has a 3% *1* branch to the 237 level. That is, Iγ(1580+1588):Iγ(1817+1825)=3 *1*:97 *1*.

The branches to the 1817 and 1825 levels are not resolved. The Eγ entries are from E(level) differences, and Iγ=23 *3* for the unresolved doublet.

@ From $\gamma(\theta)$.

& Alternate solutions of ± ∞ are ruled out since the transition is E1+M2 based on adopted π's.

a From $\gamma(\theta)$ data, RUL used when level lifetime is known.

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Level Scheme

Intensities: % photon branching from each level