^{52}Cr(α,pγ) 1972Sa38,1973Hi02,1973Hi07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Huo Junde	NDS 109, 787 (2008)	30-Apr-2007

1972Sa38: E=10.2-14.2 MeV; enriched (98%) targets (self-supporting); measured Eγ, $\gamma\gamma$-coin, pγ-coin, p$\gamma(\theta)$, and γ-ray linear polarization;

1973Hi02: E=10.5,11.1 MeV; enriched (99.8%) targets; Ge(Li) and NaI for γ; cooled surface-barrier detector for protons; pγ-coin (total line Γ=40 keV); measured Eγ, p$\gamma(\theta)$, DSA.

1973Hi07: the same authors as 1973Hi02. Deduced $T_{1/2}$ of 12 levels (from DSA), B(M1), B(E2), δ, and J or π of 6 levels (from $\gamma(\theta)$ χ^2 analyses and $T_{1/2}$).

All data are from 1973Hi02, except as noted.

^{55}Mn Levels

E(level)	J$^\pi$[†]	$T_{1/2}$[‡]	Comments
0.0	5/2$^-$		
125.95 *5*	7/2$^-$	>7 ps	
984.2 *2*	9/2$^-$	0.31 ps *+10–6*	J$^\pi$: 1972Sa38.
1292.4 *3*	11/2$^-$	2.3 ps *+29–10*	J$^\pi$: 1972Sa38.
1529.8 *3*	3/2$^-$	49 fs *+9–11*	J$^\pi$: 1973Hi02.
1885.3 *10*	7/2$^-$	11 fs *8*	
2198.5 *2*	7/2$^{(-)}$	17 fs *+9–12*	
2215.3 *3*	(5/2$^-$,7/2$^-$)	0.38 ps *+8–6*	
2253.7 *3*	(3/2$^-$)	15 fs *6*	
2269.5 *2*	(1/2 to 5/2)	148 fs *+57–21*	
2311.5 *4*	13/2$^-$	67 fs *+28–24*	J$^\pi$: 1972Sa38.
2366.0 *3*	5/2$^-$	33 fs *11*	
2399.0 *3*	5/2,7/2$^-$,9/2	15 fs *5*	
2428.6 *4*	(1/2$^+$)	1.4 ps *+10–7*	
2564.8 *4*	3/2$^-$	12 fs *6*	J$^\pi$: 1973Hi02.
2727.0 *9*	7/2$^{(-)}$	1.25[#] ps *14*	
2752.9 *15*	5/2$^-$,9/2$^{(-)}$	14[#] fs *+28–14*	
2822.8 *8*	9/2	94[#] fs *+24–31*	
2824.6 *10*	5/2,9/2	<14[#] fs	
2952.3 *10*	3/2 to 9/2	37[#] fs *+6–8*	
3004.4 *12*	1/2 to 7/2	15[#] fs *8*	
3036.6 *10*		40[#] fs *8*	
3046.3 *10*		0.14[#] ps *+10–5*	
3049.5 *10*		1.7[#] ps *+31–6*	
3082.4 *10*		18[#] fs *+12–17*	
3126.4 *10*			
3160.9 *10*	1/2,3/2$^-$,5/2	3[#] fs *+12–3*	

[†] J$^\pi$ assignments are based on $\sigma(\theta)$ χ^2 analyses by 1973Hi07, except as noted.

[‡] From DSA (1973Hi02).

[#] From DSA (1973Hi07).

^{52}Cr(α,pγ) 1972Sa38,1973Hi02,1973Hi07 (continued)

$\gamma(^{55}Mn)$

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ[#]	Comments
125.95		125.95	7/2$^-$	0.0	5/2$^-$	M1+E2	+0.07 *1*	E_γ: from 1972Sa38. δ: from 1972Sa38; other: +0.12 *4* (1973Hi02).
308.2	27 *3*	1292.4	11/2$^-$	984.2	9/2$^-$	M1+E2	+0.03 *2*	δ: from 1972Sa38; other: +0.03 *15* (1973Hi07).
739.7	15 *4*	2269.5	(1/2 to 5/2)	1529.8	3/2$^-$			
767.1	19 *6*	3036.6		2269.5	(1/2 to 5/2)			
770.9		3082.4		2311.5	13/2$^-$			
814.9	14 *9*	3126.4		2311.5	13/2$^-$			
858.2	93 *4*	984.2	9/2$^-$	125.95	7/2$^-$	M1+E2	+0.27 *1*	Predicted linear polarization=−1.00 to −0.40, exp=−0.4 *2* (1972Sa38).
867.6	54 *10*	2752.9	5/2$^-$,9/2$^{(-)}$	1885.3	7/2$^-$			
898.8		2428.6	(1/2$^+$)	1529.8	3/2$^-$			
937.5	36 *5*	2822.8	9/2	1885.3	7/2$^-$	(D+Q)	−0.13 *30*	Mult.: value assumes negative parity for 2822.8 level.
984.2	7 *4*	984.2	9/2$^-$	0.0	5/2$^-$	E2		δ: δ(E2/M3)=+2.14 *+100−350* or +0.27 *+9−7* (1973Hi02).
1019.1		2311.5	13/2$^-$	1292.4	11/2$^-$	(D+Q)	−0.41 *8*	Mult.: value assumes negative parity for 2311.5 level. δ: from 1972Sa38; values from 1973Hi07 are −0.15 *+20−30* for J^π=13/2$^-$, and +0.25 *+5−25* for J^π=9/2$^-$. The negative parity is assumed only for purpose of the calculation.
1161.0		3046.3		1885.3	7/2$^-$			
1166.4	73 *3*	1292.4	11/2$^-$	125.95	7/2$^-$	E2		δ: δ(E2/M3)=0.00 *+1−3* (1973Hi02).
1214.3	43 *5*	2198.5	7/2$^{(-)}$	984.2	9/2$^-$	M1+E2	+0.18 *13*	
1414.8	16 *5*	2399.0	5/2,7/2$^-$,9/2	984.2	9/2$^-$			
1434.6	19 *5*	2727.0	7/2$^{(-)}$	1292.4	11/2$^-$	(E2)		δ: from 1973Hi07 is +0.2 *3* (M3/E2 mixing ratio). Mult.: value assumes negative parity for 2727 level.
1519.7		3049.5		1529.8	3/2$^-$			
1529.8		1529.8	3/2$^-$	0.0	5/2$^-$	M1+E2		δ: δ=+0.15 *+4−3* or 1/δ=−0.06 *+5−18*.
1530.4	64 *5*	2822.8	9/2	1292.4	11/2$^-$	(D+Q)		Mult.: value assumes negative parity for 2822.8 level. δ: δ=+0.02 *8* or 1/δ=−0.04 *8*.
1631.1		3160.9	1/2,3/2$^-$,5/2	1529.8	3/2$^-$			
1742.8	28 *5*	2727.0	7/2$^{(-)}$	984.2	9/2$^-$	(D+Q)	−0.9 *+6−20*	Mult.: value assumes negative parity for 2727 level.
1759.3	34 *4*	1885.3	7/2$^-$	125.95	7/2$^-$	M1+E2	−0.05 *+9−12*	δ: δ=−0.58 *15*, for J^π=5/2$^-$.
1885.3	66 *4*	1885.3	7/2$^-$	0.0	5/2$^-$	M1+E2	+0.16 *5*	δ: δ=−0.38 *+15−8*, for J^π=5/2$^-$.
2142.2	86 *9*	3126.4		984.2	9/2$^-$			
2198.5	57 *5*	2198.5	7/2$^{(-)}$	0.0	5/2$^-$	M1+E2	−0.17 *10*	
2215.3		2215.3	(5/2$^-$,7/2$^-$)	0.0	5/2$^-$	M1+(E2)		δ: δ=+0.6 *+10−5* or +1.6 *+30−8*.
2240.0	84 *3*	2366.0	5/2$^-$	125.95	7/2$^-$	M1+E2		δ: δ=−0.2 *+1−6* or −2.6 *+13−80*.
2253.7		2253.7	(3/2$^-$)	0.0	5/2$^-$	M1+E2		δ: δ=0.0 *3* or 1/δ=−0.25 *+25−35*.
2269.5	85 *4*	2269.5	(1/2 to 5/2)	0.0	5/2$^-$			
2273.0	84 *5*	2399.0	5/2,7/2$^-$,9/2	125.95	7/2$^-$			

Continued on next page (footnotes at end of table)

^{52}Cr(α,pγ) 1972Sa38,1973Hi02,1973Hi07 (continued)

γ(^{55}Mn) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
2366.0	16 *3*	2366.0	$5/2^-$	0.0	$5/2^-$	E2	δ: $1/\delta$=−0.1 *+3−14*.
2564.8		2564.8	$3/2^-$	0.0	$5/2^-$	M1+(E2)	δ: δ=+0.02 *+5−4* or +5.68 *+31−24* (1973Hi02).
2626.9	46 *10*	2752.9	$5/2^-$,$9/2^{(-)}$	125.95	$7/2^-$		
2698.6		2824.6	5/2,9/2	125.95	$7/2^-$		
2727.0	53 *5*	2727.0	$7/2^{(-)}$	0.0	$5/2^-$	(D,Q)	Mult.: value assumes negative parity for 2727 level. δ: $1/\delta$=+0.02 *20* or δ=+0.25 *+20−10*.
2826.3		2952.3	3/2 to 9/2	125.95	$7/2^-$		
2910.6	81 *6*	3036.6		125.95	$7/2^-$		
3004.4		3004.4	1/2 to 7/2	0.0	$5/2^-$		

[†] Calculated by evaluator from E(level) values of 1973Hi02 and 1973Hi07. Corrections due to nuclear recoil (less than 0.1 keV) have been omitted.
[‡] Percent branching ratio. For γ-rays that are from E(level)>2600, see 1973Hi07.
[#] From 1973Hi07, phase convention of 1970Kr03 (Krane and Steffen).

^{52}Cr(α,pγ) 1972Sa38,1973Hi02,1973Hi07

Level Scheme

Intensities: Relative I_γ

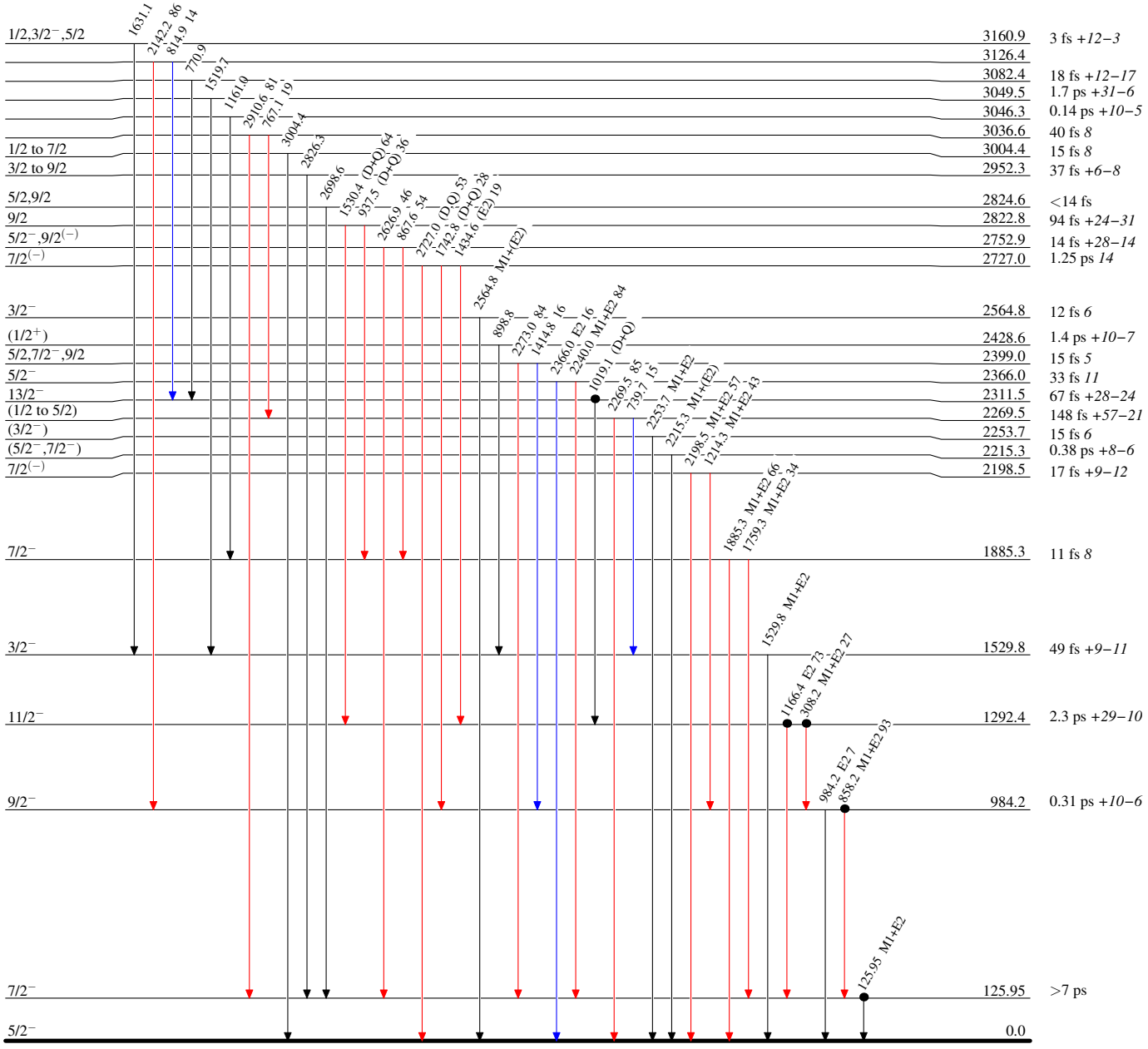
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

Coincidence



$^{55}_{25}Mn_{30}$