^{71}Ga(α,2nγ) 1977He08

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 158, 1 (2019)	16-May-2019

Includes ^{58}Fe(^{18}O,2npγ); ^{68}Zn(^{7}Li,3nγ); ^{63},^{65}Cu(^{16}O,X).

1977He08, 1976He05: (α,2nγ), E=17-24 MeV, measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$; (^{18}O,2npγ), E=40-52.5 MeV, $\gamma(\theta)$, lifetimes by recoil distance method.

1974Pr14: (α,2nγ), E=15-24 MeV. Measured Eγ, Iγ, $\gamma(\theta)$.

Others:

1977ShZR: ^{68}Zn(^{7}Li,3nγ). Measured $\gamma(\theta$,H,t); deduced quadrupole interaction frequency for 428-keV isomer.

1975Re06: (α,2nγ), measured $\gamma(\theta$,H,t), deduced g factor.

1975We20: ^{63}Cu(^{16}O,X), ^{65}Cu(^{16}O,X), E=38.5-51.0 MeV. Measured Eγ, Iγ; deduced cross section.

1969Qu03: (α,2nγ). Measured $\gamma(\theta$,H), NMR.

1969Iv02: (α,xnγ), measured lifetime of microsecond isomer.

All data are from (α,2nγ) in 1977He08, unless otherwise noted.

^{73}As Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0	$3/2^-$		
67.09 *16*	$5/2^-$		g=0.65 *4* (1975Re06)
254.1 *2*			
393.1 *11*			
428.08 *24*	$9/2^+$	6.0 μs *12*	g=+1.146 *7* (1969Qu03) $T_{1/2}$: pulsed α-particle beam, γ(t) (1969Iv02).
510.1 *11*	$(5/2^+)$		
573.1 *11*			
577.4 *2*			
655.4 *3*	$(3/2^-)$		
861.12 *16*	$(7/2^-)$		
929.1 *3*	$(9/2^-)$		
1012.4 *11*			
1037.3 *3*	$13/2^+$	8.3 ps *6*	$T_{1/2}$: from recoil-distance method (1976He05).
1178.28 *22*	$(9/2^-)$		
1293.3 *3*	$11/2^+$		
1658.56 *21*			
1761.8 *3*	$(9/2^+,13/2^+)$		
1950.0 *4*	$17/2^+$		
2039.5 *4*	$(9/2^-,13/2^-)$		
2039.9 *3*	$(15/2^+)$		
2415.6 *4*			
2475.98 *25*			
2622.9 *11*			
2848.0 *4*	$(13/2^-,17/2^-)$		
2965.3 *4*	$(21/2^+)$		
3050.7 *4*			
3294.6 *4*			
4083.1 *5*	$(23/2^+,25/2^+)$		

[†] From least-squares fit to Eγ data.

[‡] As proposed in 1977He08, based on previous assignments for low-lying levels, and their $\gamma(\theta)$ data for higher levels. See also Adopted Levels.

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$\gamma(^{73}As)$

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
67.1 *2*	>130	67.09	5/2$^-$	0.0	3/2$^-$		
139[a]	<1	393.1		254.1			
254.1 *2*	3.1 *3*	254.1		0.0	3/2$^-$		A_2=−0.01 *7*; A_4=−0.02 *9*
319	<1	573.1		254.1			
357	<1	1012.4		655.4	(3/2$^-$)		
361.1 *2*	100 *3*	428.08	9/2$^+$	67.09	5/2$^-$	M2+E3	Mult.: from Adopted Gammas. δ(E3/M2)=+0.03 *2* if δ(67γ)=+0.035.
401.3 *2*	2.4 *2*	655.4	(3/2$^-$)	254.1			A_2=−0.32 *7*; A_4=−0.17 *9*
436.2 *2*	1.5 *2*	2475.98		2039.5	(9/2$^-$,13/2$^-$)	D	A_2=−0.39 *7*; A_4=−0.04 *9*
443	<1	510.1	(5/2$^+$)	67.09	5/2$^-$		
468.4 *2*	5.2 *3*	1761.8	(9/2$^+$,13/2$^+$)	1293.3	11/2$^+$	D	A_2=−0.48 *6*; A_4=+0.05 *8*
480.2 *2*	7.3 *7*	1658.56		1178.28	(9/2$^-$)		
577.4[a] *2*	1.1 *2*	577.4		0.0	3/2$^-$		
583.0	<1	2622.9		2039.9	(15/2$^+$)		
609.3 *2*	64 *3*	1037.3	13/2$^+$	428.08	9/2$^+$	(E2)	A_2=+0.34 *7*, A_4=−0.07 *7* from (α,2nγ) (1977He08). A_2=+0.30 *5*, A_4=−0.07 *7* from (^{18}O,2npγ) (1977He08). Additional information 1.
724.4 *2*	3.8 *7*	1761.8	(9/2$^+$,13/2$^+$)	1037.3	13/2$^+$		A_2=+0.19 *8*; A_4=−0.06 *9* Mult.: possible ΔJ=0, dipole transition.
746.6 *2*	2.2 *3*	2039.9	(15/2$^+$)	1293.3	11/2$^+$		
783.7[a] *3*	<0.5	1293.3	11/2$^+$	510.1	(5/2$^+$)		This γ from 11/2$^+$ to (5/2$^+$), implying mult=M3, is unlikely.
794.0[†] *2*	3.8 *4*	861.12	(7/2$^-$)	67.09	5/2$^-$		
797.4[†] *2*	3.3 *4*	1658.56		861.12	(7/2$^-$)		
808.5 *2*	9.5 *6*	2848.0	(13/2$^-$,17/2$^-$)	2039.5	(9/2$^-$,13/2$^-$)	(Q)	A_2=+0.22 *7*; A_4=−0.02 *9*
817.3 *2*	5.4 *4*	2475.98		1658.56			
861.1 *2*	<22[@]	861.12	(7/2$^-$)	0.0	3/2$^-$	(Q)	A_2=+0.22 *6*; A_4=−0.12 *8* A_2, A_4 for 861.1+862.0.
862.0 *2*	<22[@]	929.1	(9/2$^-$)	67.09	5/2$^-$	(Q)	A_2=+0.22 *6*; A_4=−0.12 *8*
865.3 *2*	16.3 *14*	1293.3	11/2$^+$	428.08	9/2$^+$	D	A_2=−0.58 *5*; A_4=0.00 *7*
912.7 *2*	27.1 *16*	1950.0	17/2$^+$	1037.3	13/2$^+$	Q	A_2=+0.31 *7*, A_4=−0.11 *9* from (α,2nγ) (1977He08). A_2=+0.28 *6*, A_4=−0.09 *7* from (^{18}O,2npγ) (1977He08).
1002.6 *2*	10.2 *9*	2039.9	(15/2$^+$)	1037.3	13/2$^+$	(M1+E2)	A_2=−0.54 *6*; A_4=+0.27 *8* Mult.: $\gamma(\theta)$ indicates appreciable L=2 admixture.
1015.2[†] *2*	8.1 *15*	2965.3	(21/2$^+$)	1950.0	17/2$^+$	Q	A_2=+0.36 *13*, A_4=−0.11 *16* from (α,2nγ) (1977He08). A_2=+0.31 *8*, A_4=−0.12 *9* from (^{18}O,2npγ) (1977He08).
1100.6 *2*	3.8 *7*	3050.7		1950.0	17/2$^+$		
1110.4 *2*	<19[&]	2039.5	(9/2$^-$,13/2$^-$)	929.1	(9/2$^-$)	Q	A_2=+0.37 *10*; A_4=−0.12 *8*
1111.1 *2*	<19[&]	1178.28	(9/2$^-$)	67.09	5/2$^-$		
1117.8 *2*	2.4 *6*	4083.1	(23/2$^+$,25/2$^+$)	2965.3	(21/2$^+$)		
1122.3[†] *2*	1.5 *5*	2415.6		1293.3	11/2$^+$		
1254.7 *2*	2.0 *4*	3294.6		2039.9	(15/2$^+$)		
1333.7[a] *2*	8.7 *6*	1761.8	(9/2$^+$,13/2$^+$)	428.08	9/2$^+$		

Continued on next page (footnotes at end of table)

^{71}Ga(α,2nγ) 1977He08 (continued)

$\gamma(^{73}As)$ (continued)

† Doublet.
‡ From E(α)=21 MeV, θ=125°.
# From $\gamma(\theta)$ in 1977He08, except where noted otherwise.
@ Iγ(861.1)+Iγ(862.0)=22 *3*.
& Iγ(1111.1)+Iγ(1110.4)=19 *3*.
a Placement of transition in the level scheme is uncertain.

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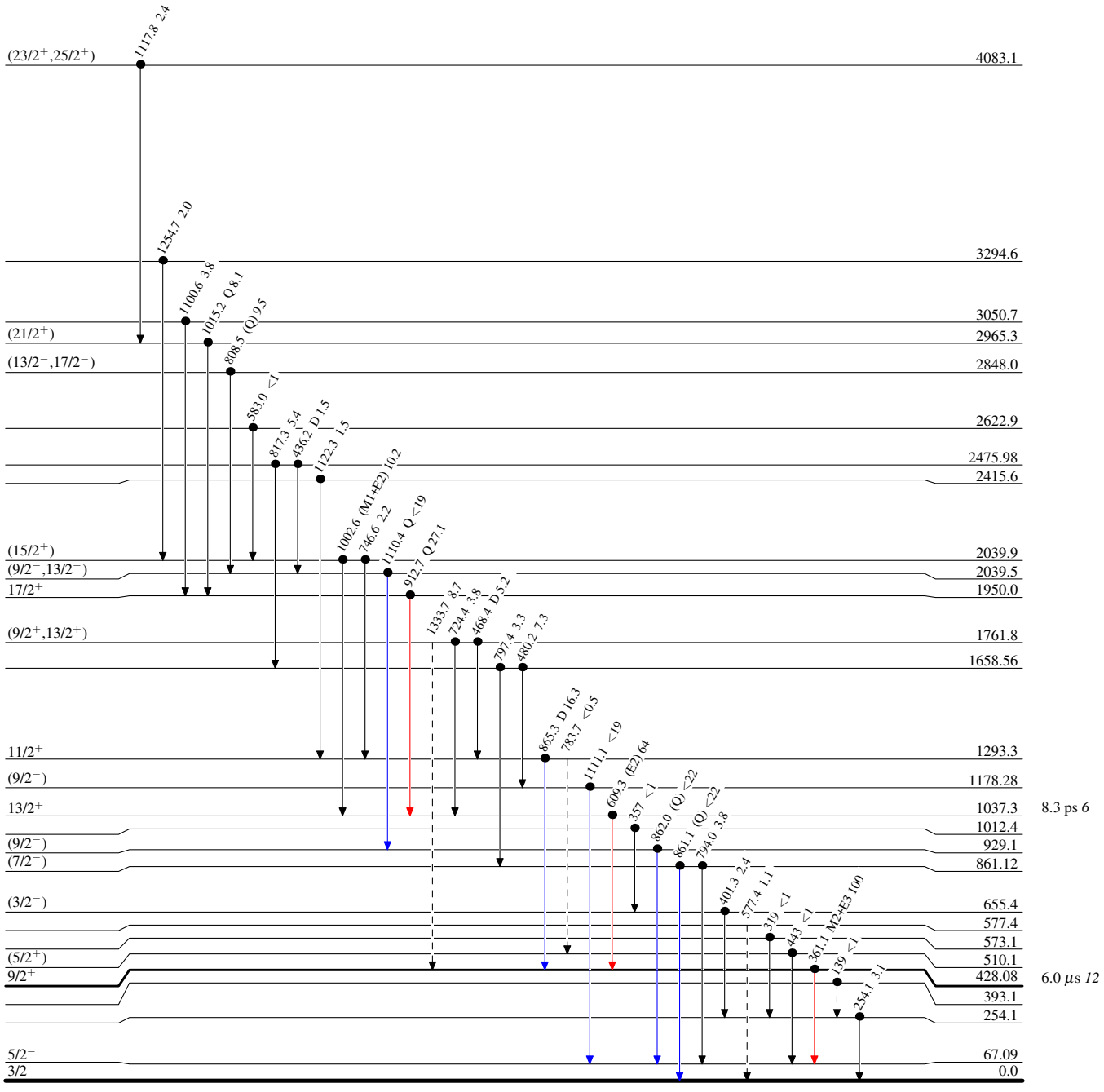
Level Scheme

Intensities: Relative I_γ

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence



$^{73}_{33}As_{40}$