^{64}Zn(α,nγ), ^{63}Cu(^{6}Li,2nγ) 1983Mu15,1979Al04,1978Mu05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huo Junde, Huang Xiaolong, J. K. Tuli	NDS 106, 159 (2005)	1-Apr-2005

1983Mu15: E(α)=9.5-11.5 MeV; Eγ, Iγ, $\gamma(\theta)$, $\gamma\gamma(\theta)$, γ-excitation functions E(^{6}Li)=15 MeV; $\gamma(\theta)$, directional correlations with an oriented source.

1979Al04: E(α)=9-15 MeV; Eγ, nγ and $\gamma\gamma$ coincidences, delayed γ and x-ray coincidences, γ excitation functions, $\gamma(\theta)$, γ polarization, $T_{1/2}$ and magnetic moment of isomeric state.

1978Mu05: E(α)=9-12 MeV; Eγ, Iγ, $T_{1/2}$, α(K)exp.

1978Na10: E(α)=15.4-21.5 MeV; Eγ, Iγ, α(K)exp, $T_{1/2}$.

1973BeVT: E(α)=13 MeV; measured g-factor by perturbed angular distributions; $T_{1/2}$ by pulsed beam.

The level scheme is based on the data of 1983Mu15; there are substantial differences between this level scheme and the one proposed by 1979Al04. These differences have to be resolved by more experimental data.

^{67}Ge Levels

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$	Comments
0.0	1/2^{-}		J$^{\pi}$: 1/2 from $\gamma(\theta)$ (1983Mu15).
18.20 *5*	5/2^{-}	13.7 μs *9*	$T_{1/2}$: average of 12.8 μs *2* (1978Mu05) and 14.6 μs *2* (1979Al04) both measured by pulsed beam. J$^{\pi}$: 5/2 from $\gamma(\theta)$ (1983Mu15).
122.59 *15*	3/2$^{(-)}$		J$^{\pi}$: 3/2 from $\gamma(\theta)$ (1983Mu15).
243.60 *17*	3/2$^{(-)}$		J$^{\pi}$: 3/2 from $\gamma(\theta)$ (1983Mu15).
711.55 *24*	5/2$^{(-)}$		J$^{\pi}$: 5/2 from $\gamma(\theta)$ (1983Mu15).
714.70 *25*			
752.2 *3*	9/2^{+}	110.9 ns *14*	g=−0.210 *7* (1973BeVT) $T_{1/2}$: by pulsed beam (1979Al04); others: 70 ns *7* (1973BeVT), 102 ns *10* (1978Na10).
808.13 *18*			
929.4 *3*			
1019.83 *25*	5/2$^{(-)}$		J$^{\pi}$: 5/2 from $\gamma(\theta)$ (1983Mu15).
1150.0 *3*			
1159.0 *4*			
1256.7 *3*			
1273.7 *4*			
1293.9 *4*			
1431.8 *11*			
1652.8 *4*			
1698.3 *5*			
1900.7 *4*			
2096.8 *8*			
2156.4 *8*			
2218.2 *10*			
2251.3 *8*			
2524.4 *8*			
2597.2 *8*			

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

[‡] From Adopted Levels; supporting arguments from this reaction are indicated.

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$\gamma(^{67}Ge)$

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ[@]	α[&]	Comments
18.20	5/2$^-$	18.20 *5*		0.0	1/2$^-$	E2		364	α(K)exp=176 *29* (1978Mu05) α(K)exp: Other: >300 (1979Al04). Mult.: from α(K)exp.
122.59	3/2$^{(-)}$	104.4 *3*	19.2 *4*	18.20	5/2$^-$	(M1+E2)	≥4	0.614	
		122.7 *3*	80.8 *4*	0.0	1/2$^-$	(M1(+E2))	0.85 *85*	0.17 *13*	
243.60	3/2$^{(-)}$	120.8 *3*	51.1 *13*	122.59	3/2$^{(-)}$	(M1+E2)	≥5	0.361	
		225.4 *3*	7.6 *9*	18.20	5/2$^-$				
		243.6 *3*	41.3 *15*	0.0	1/2$^-$				δ: +0.04 *16* or −1.7 *+6−10* for (M1+E2).
711.55	5/2$^{(-)}$	589.0 *3*		122.59	3/2$^{(-)}$	(M1+E2)	−1.1 *+6−23*		
		693.1 *5*		18.20	5/2$^-$				
714.70		471.2 *3*		243.60	3/2$^{(-)}$				
		592.0[‡] *3*		122.59	3/2$^{(-)}$				
752.2	9/2$^+$	734.0 *3*		18.20	5/2$^-$	M2			α(K)exp=1.41×10^{-3} *5* (1978Na10)
808.13		685.5[‡] *3*	33 *5*	122.59	3/2$^{(-)}$				
		789.9 *3*	13 *4*	18.20	5/2$^-$				E_γ: not present in the nγ coincidence spectrum (1979Al04); 1978Al32 place it in the ^{67}Ga decay scheme.
		808.1 *3*	54 *6*	0.0	1/2$^-$				
929.4		217.9[‡] *3*		711.55	5/2$^{(-)}$				
		807.0 *10*		122.59	3/2$^{(-)}$				
		911.0 *5*		18.20	5/2$^-$				
1019.83	5/2$^{(-)}$	776.0 *3*		243.60	3/2$^{(-)}$				
		897.5 *3*		122.59	3/2$^{(-)}$	(M1+E2)	−1.0 *+8−24*		
1150.0		437.8 *7*		711.55	5/2$^{(-)}$				
		1131.9 *3*		18.20	5/2$^-$				
1159.0		1036.4 *3*		122.59	3/2$^{(-)}$				
1256.7		327.5 *7*		929.4					
		1256.7 *3*		0.0	1/2$^-$				
1273.7		465.0 *7*		808.13					
		1151.4 *5*		122.59	3/2$^{(-)}$				
		1274.0 *10*		0.0	1/2$^-$				
1293.9		1049.6 *10*		243.60	3/2$^{(-)}$				
		1171.3 *5*		122.59	3/2$^{(-)}$				
		1294.0 *5*		0.0	1/2$^-$				
1431.8		1309.2 *10*		122.59	3/2$^{(-)}$				
1652.8		633.0 *3*		1019.83	5/2$^{(-)}$				
1698.3		1576.7 *10*		122.59	3/2$^{(-)}$				
		1698.0 *5*		0.0	1/2$^-$				
1900.7		248.0 *3*		1652.8					
		1657.0 *5*		243.60	3/2$^{(-)}$				
2096.8		1385.2 *10*		711.55	5/2$^{(-)}$				
2156.4		1912.8 *10*		243.60	3/2$^{(-)}$				
		2156.4 *10*		0.0	1/2$^-$				
2218.2		2218.2 *10*		0.0	1/2$^-$				
2251.3		1443.4 *10*		808.13					
		2128.4 *10*		122.59	3/2$^{(-)}$				
2524.4		1230.7 *10*		1293.9					

Continued on next page (footnotes at end of table)

^{64}Zn(α,nγ), ^{63}Cu(^{6}Li,2nγ) 1983Mu15,1979Al04,1978Mu05 (continued)

$\gamma(^{67}Ge)$ (continued)

E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π
2524.4		2280.6 *10*	243.60	3/2$^{(-)}$
2597.2		500.3 *3*	2096.8	
		2474.6 *10*	122.59	3/2$^{(-)}$

† From 1983Mu15.
‡ Not seen by 1979Al04 in coincidence spectra.
# Percent branching from 1978Mu05.
@ From adopted gammas.
& Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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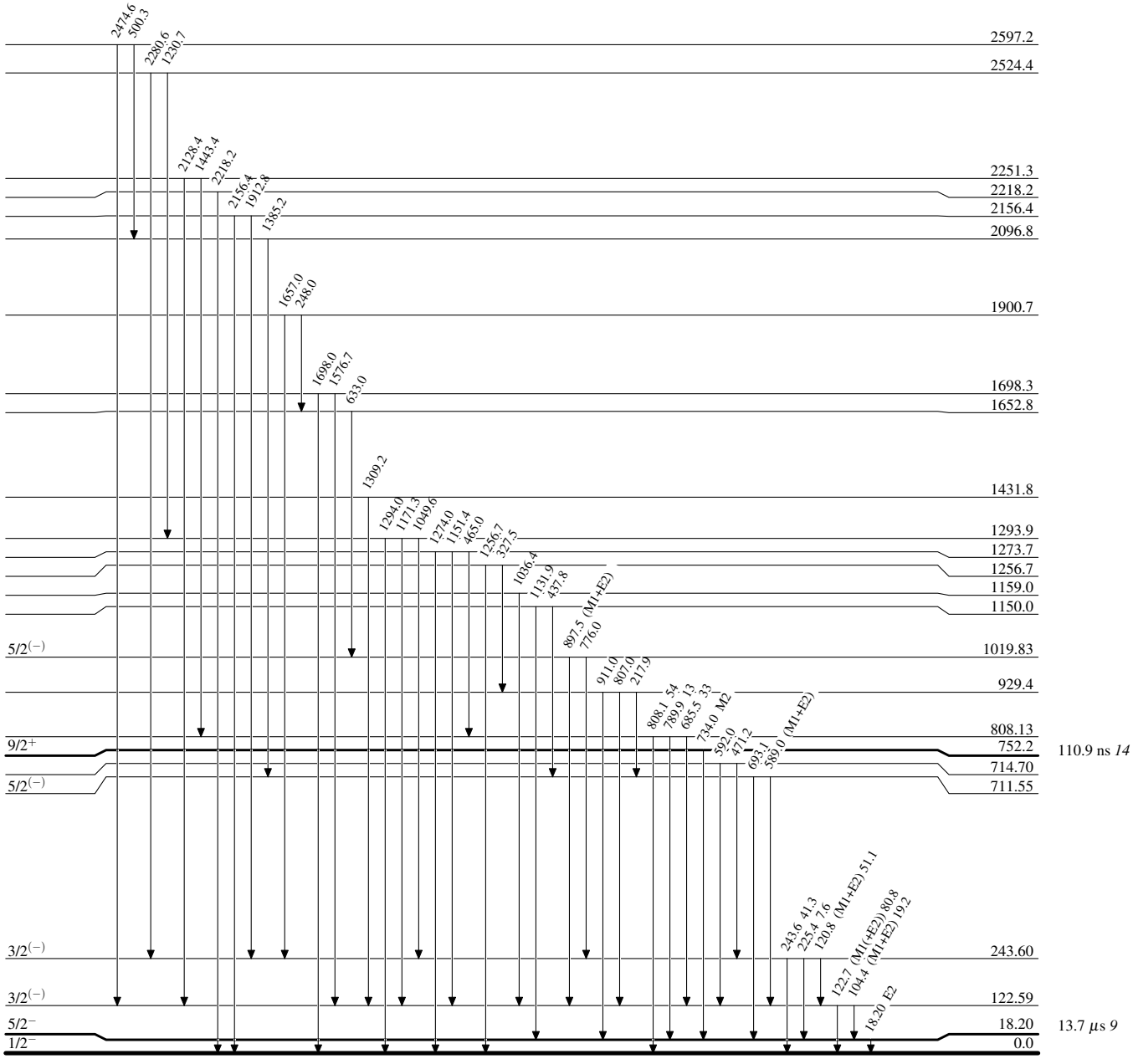
Level Scheme

Intensities: % photon branching from each level



$^{67}_{32}Ge_{35}$