

⁷⁰Zn($\alpha,2n\gamma$), ⁷⁰Ge($\alpha,^2$ He) 1979Mo01,1985Ja02

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	D. Abriola(a), A. A. Sonzogni		NDS 111,1 (2010)	1-May-2009

⁷⁰Zn($\alpha,2n\gamma$), E=22-35 MeV, measured yield function, $\gamma\gamma$ coincidence, $\gamma(\theta)$, $\gamma\gamma(\theta)$, $\gamma(t)$, DSA (1979Mo01).

⁷⁰Ge($\alpha,^2$ He), E=57 MeV, $\sigma(\theta)$ from 15° to 42°, zero-range DWBA (1985Ja02).

Data are mainly from 1979Mo01.

⁷²Ge Levels

E(level)	J π [†]	T _{1/2} [#]	Comments
0	0 ⁺		
833.97 20	2 ⁺	2.8 ps +21-7	
1463.8 3	2 ⁺	3 ps +4-2	
1728.2 3	4 ⁺	1.2 ps +14-3	
2064.6 4	3 ⁺	≥ 2 ps	J π : parity based on L-values from (³ He,d) reaction.
2395.9 4			
2463.7 3	4 ⁺	1.4 ps +35-7	
2514.6 3	3 ^{-‡}	0.7 ps +7-4	
2772.0 3	6 ⁺	0.7 ps +7-4	
2875.4 4			
3080.0 4	4 ^{+‡}		
3128.8 3	5 ⁻	3.5 ps +7-21	
3401.7 3	(6 ⁺)	1 ps +4-1	
3667.2 4	6 ^{+‡}	> 2.1 ps	
3760.5 4	8 ⁺	0.8 ps +5-2	An 8 ⁺ nn state identified unambiguously at 3720 100 (1985Ja02).
3784.1 4	7 ⁻	≥ 2.8 ps	A 7 ⁻ nn state identified unambiguously at 3720 100 (1985Ja02).
3839.9 5	4 ⁺		
3898.5 4	(7 ⁻)		1985Ja02 assigned a 6 ⁺ nn state at 3890 100 tentatively due to incomplete angular distribution.
4077.5 4	8 ⁺	0.8 ps +15-7	
4291.9 4		0.5 ps +7-1	
4521.0?			
4741.3 4	9 ⁻	0.90 ps +14-7	
4820.0 4	(10 ⁺)	0.51 ps +7-4	
4950.2 4			
5082.5 4			
5395.5?			
5420.9?			
5837.8 4	11 ⁻	0.9 ps +4-2	
6115.0 5	(12 ⁺)	0.33 ps +7-4	

[†] Except where noted, J π assignments are based on mult of decay γ and yield function measurements.

[‡] From Adopted Levels.

[#] From DSAM.

$\gamma(^{72}\text{Ge})$

E γ	I γ [†]	E _i (level)	J π _i	E _f	J π _f	Mult. [@]	Comments
216		4291.9		4077.5	8 ⁺		
273.6& 2	10	3401.7	(6 ⁺)	3128.8	5 ⁻		E γ : not a good fit to level energy difference.
317.2 2	11	4077.5	8 ⁺	3760.5	8 ⁺	M1	δ : +11 12.
357 [‡]	47 [#]	3128.8	5 ⁻	2772.0	6 ⁺		

Continued on next page (footnotes at end of table)

$^{70}\text{Zn}(\alpha, 2n\gamma), ^{70}\text{Ge}(\alpha, ^2\text{He})$ **1979Mo01, 1985Ja02 (continued)** $\gamma(^{72}\text{Ge})$ (continued)

E_γ	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. @	δ°	Comments
538.4 2	20	3667.2	6 ⁺	3128.8	5 ⁻	(E1)		
600.8 2	60	2064.6	3 ⁺	1463.8	2 ⁺	M1+E2	$\approx +4$	$\delta: +3.3$ from $\gamma\gamma(\theta)$.
614.2 2	60	3128.8	5 ⁻	2514.6	3 ⁻	E2		$\delta: +10$ 10.
630.0 2	150	1463.8	2 ⁺	833.97	2 ⁺	M1+E2	-2.9 11	$\delta: -6.67$ from $\gamma\gamma(\theta)$.
655.4 2	70	3784.1	7 ⁻	3128.8	5 ⁻	E2		
667 [‡]	24 [#]	3128.8	5 ⁻	2463.7	4 ⁺			
735.3 2	20	2463.7	4 ⁺	1728.2	4 ⁺	M1		
759.9 2	23	3839.9	4 ⁺	3080.0	4 ⁺			
786.5 2	40	2514.6	3 ⁻	1728.2	4 ⁺			
834.0 2	1000	833.97	2 ⁺	0	0 ⁺	E2		
843.0 2		4741.3	9 ⁻	3898.5	(7 ⁻)			
894.1 2	760	1728.2	4 ⁺	833.97	2 ⁺	E2		$\delta: +11$ 12.
932.1 2	36	2395.9		1463.8	2 ⁺			
937.9 2	43	3401.7	(6 ⁺)	2463.7	4 ⁺	(E2)		$\delta: +20$ 40.
957.0 2	110	4741.3	9 ⁻	3784.1	7 ⁻	E2		$\delta: +100$ 1000.
988.6 2	200	3760.5	8 ⁺	2772.0	6 ⁺	E2		$\delta: +50$ 250.
1000.0 2	50	2463.7	4 ⁺	1463.8	2 ⁺	E2		$\delta: -10$ 10.
1011.9 2	70	3784.1	7 ⁻	2772.0	6 ⁺			
1015.4 2	50	3080.0	4 ⁺	2064.6	3 ⁺			
1043.8 2	550	2772.0	6 ⁺	1728.2	4 ⁺	E2		$\delta: +50$ 250.
1051 [‡]	74 [#]	2514.6	3 ⁻	1463.8	2 ⁺			
1059.5 2	60	4820.0	(10 ⁺)	3760.5	8 ⁺	E2		$\delta: -33$ 110.
1096.5 2	110	5837.8	11 ⁻	4741.3	9 ⁻	E2		$\delta: +20$ 40.
1119.0& 2		4521.0?		3401.7	(6 ⁺)			
1126.6 2	100	3898.5	(7 ⁻)	2772.0	6 ⁺			
1166.0 2		4950.2		3784.1	7 ⁻			
1295.0 2	30	6115.0	(12 ⁺)	4820.0	(10 ⁺)	E2		
1305.4 2	70	4077.5	8 ⁺	2772.0	6 ⁺	E2		$\delta: +33$ 110.
1322.0 2		5082.5		3760.5	8 ⁺			
1343.8& 2		5420.9?		4077.5	8 ⁺			
1400.4 2	84	3128.8	5 ⁻	1728.2	4 ⁺			I_γ : from the table of branching ratios. However, $\gamma(\theta)$ table gives 50.
1411.6 2	30	2875.4		1463.8	2 ⁺			
1463 [‡]	26 [#]	1463.8	2 ⁺	0	0 ⁺			
1497.0& 2		5395.5?		3898.5	(7 ⁻)			
1519.8 2		4291.9		2772.0	6 ⁺			
1673.6 2	40	3401.7	(6 ⁺)	1728.2	4 ⁺			

[†] Relative intensity at E=30 MeV. Uncertainties not given by 1979Mo01.

[‡] Values taken from the author's drawing (1979Mo01).

[#] Taken from a table of branching ratios.

@ From $\gamma(\theta)$ and $\gamma\gamma(\theta)$.

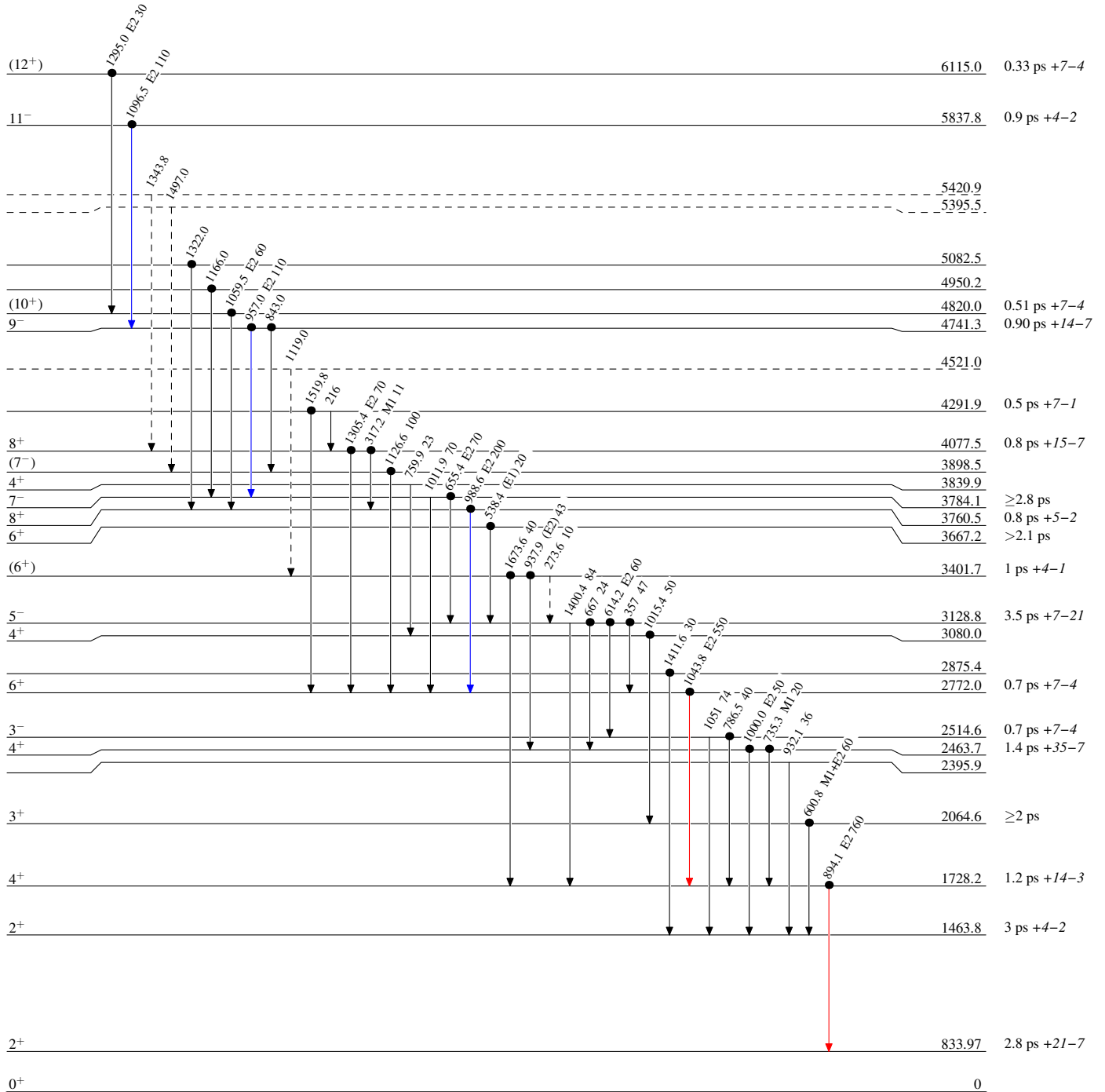
& Placement of transition in the level scheme is uncertain.

$^{70}\text{Zn}(\alpha,2n\gamma), ^{70}\text{Ge}(\alpha,^2\text{He})$ 1979Mo01,1985Ja02

Legend

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

Level Scheme

Intensities: Relative I_γ  $^{72}\text{Ge}_{40}$

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Legend

Level Scheme (continued)

Intensities: Relative I_γ

- $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
- $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
- $I_\gamma > 10\% \times I_\gamma^{\text{max}}$
- Coincidence

