^{68}Zn(α,pnγ) 1977Mo01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	G. Gürdal, E. A. Mccutchan	NDS 136, 1 (2016)	1-Jul-2016

1977Mo01: E(α)=23-40 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, excitation function, $\gamma\gamma$(t) using Ge(Li) detectors.

Others: 1971Ar12: ^{67}Zn(α,pγ) with E(α)=14 MeV. Measured Eγ, γ-p coincidences with coaxial Ge detector. With the exception of a 1263.0γ, all γ-rays observed by 1971Ar12 were also observed in 1977Mo01. 1971Ar12 provides placements for only a few of these transitions which are consistent with the placements of 1977Mo01. Also 1975EbZZ, E(α)=13 MeV. Measured Eγ with Ge(Li) detector. Observed 5 γ rays and their placement consistent with the results of 1977Mo01.

^{70}Ga Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	Comments
0.0	1^+		
508.5 *10*	2^+		
691.0 *10*	2^-		
879.1 *10*	4^-	22 ns *2*	
901.8 *10*	$1^+,2^+,3^+$	<1.4 ns	J$^\pi$: J=3,4 from $\gamma(\theta)$, absence of ground-state transition favors 4.
1034.2 *10*	$(5)^-$		J$^\pi$: $\gamma(\theta)$ consistent with J=5.
1086.7?		24 ns *4*	E(level): difficulty in extracting information about the 185γ mixed with the strong 188γ makes this level questionable. J$^\pi$: $\gamma(\theta)$ suggests J=6.
1180.7 *10*	5		J$^\pi$: from $\gamma(\theta)$.
1234.3 *11*	$(6)^-$		J$^\pi$: $\gamma(\theta)$ for 200γ shows dipole character and yield function consistent with J=6.
1263.0			
1371.6 *11*	(7^-)		J$^\pi$: $\gamma(\theta)$ of 138γ shows dipole character and yield function consistent with J=7.
1523.4 *15*			
1538.8 *11*	(6)		J$^\pi$: J=(6,8) from $\gamma(\theta)$.
1687.7 *11*	6^-		J$^\pi$: J=6,7,8 from $\gamma(\theta)$.
2601.5 *11*	(8)		J$^\pi$: $\gamma(\theta)$ and yield function favor J=8.
2651.6 *15*	$^-$		
2886.3 *11*	(9)		J$^\pi$: from $\gamma(\theta)$ and yield function for 285γ favor J=9 assuming J=8 for 2602 level.

[†] From a least-squares fit to Eγ, by evaluators.

[‡] From the Adopted Levels. Additional support provided by the information from this dataset is included in the comments.

[#] From $\gamma\gamma$(t) in 1977Mo01. For levels other than the 897-keV, 902-keV and 1087-keV levels, an upper limit on the half-life of T$_{1/2}$ < 4 ns was found.

$\gamma(^{70}$Ga)

E$_\gamma$[†]	I$_\gamma$[‡]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[#]	δ[#]	Comments
137.6 *1*	26	1371.6	(7^-)	1234.3	$(6)^-$	D(+Q)	0.0 *1*	Mult.,δ: A$_2$=−0.29 *3*, A$_4$=−0.01 *3* (1977Mo01).
146.8 *1*	5.3	1180.7	5	1034.2	$(5)^-$	D+Q	+1.1 *3*	Mult.,δ: A$_2$=+0.23 *5*, A$_4$=−0.2 *1* (1977Mo01).
155.5 *1*	75	1034.2	$(5)^-$	879.1	4^-	D(+Q)	0.0 *1*	Mult.,δ: A$_2$=−0.27 *4*, A$_4$=−0.06 *5* (1977Mo01).
167.4 *1*	2.3	1538.8	(6)	1371.6	(7^-)	D(+Q)	+0.1 *1*	Mult.,δ: A$_2$=−0.37 *7*, A$_4$=+0.25 *8* (1977Mo01).
184.9[@] *1*	6	1086.7?		901.8	$1^+,2^+,3^+$			A$_2$=+0.38 *21*, A$_4$=+0.2 *1* (1977Mo01).
188.1 *1*	90	879.1	4^-	691.0	2^-	Q		Mult.: A$_2$=+0.26 *4*, A$_4$=−0.03 *6* (1977Mo01). δ: δ(O/Q)=0.0 *1* (1977Mo01).
200.3 *1*	43	1234.3	$(6)^-$	1034.2	$(5)^-$	D(+Q)	0.0 *1*	Mult.,δ: A$_2$=−0.23 *1*, A$_4$=−0.07 *1* (1977Mo01).
284.8 *1*	6.0	2886.3	(9)	2601.5	(8)	D(+Q)	0.0 *2*	Mult.,δ: A$_2$=−0.22 *10*, A$_4$=−0.2 *1* (1977Mo01).
289.1 *1*		1523.4		1234.3	$(6)^-$			
301.2 *1*	15	1180.7	5	879.1	4^-	D(+Q)	0.0 *1*	Mult.,δ: A$_2$=−0.22 *3*, A$_4$=−0.1 *1* (1977Mo01).
304.3 *1*	5.7	1538.8	(6)	1234.3	$(6)^-$	D+Q	+0.4 *1*	Mult.,δ: A$_2$=+0.38 *7*, A$_4$=−0.1 *1* (1977Mo01).
316.1 *1*	9.0	1687.7	6^-	1371.6	(7^-)	D(+Q)	+0.05 *10*	Mult.,δ: A$_2$=−0.25 *5*, A$_4$=+0.03 *6* (1977Mo01).

Continued on next page (footnotes at end of table)

^{68}Zn(α,pnγ) 1977Mo01 (continued)

$\gamma(^{70}Ga)$ (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[#]	Comments
337.1 *1*	3.8	1371.6	(7^-)	1034.2	$(5)^-$	Q		Mult.: A_2=+0.22 *10*, A_4=+0.04 *10* (1977Mo01). δ: δ(O/Q)=0.0 *1*.
355.8 *1*	2.7	1234.3	$(6)^-$	879.1	4^-			I_γ: from Iγ(200γ)/Iγ(356γ)=0.94/0.06 and Iγ(200γ)=43.
393.3 *1*	13	901.8	$1^+,2^+,3^+$	508.5	2^+	Q		Mult.: A_2=+0.25 *5*, A_4=+0.03 *7* (1977Mo01). δ: δ(O/Q)=0.16 *20* (1977Mo01).
508.5 *1*		508.5	2^+	0.0	1^+			
691.0 *1*	100	691.0	2^-	0.0	1^+			
1229.9 *1*	20	2601.5	(8)	1371.6	(7^-)	D(+Q)	0.0 *2*	Mult.,δ: A_2=−0.23 *13*, A_4=+0.02 *20* (1977Mo01).
1263.0 *15*		1263.0		0.0	1^+			E_γ: from 1971Ar12.
1280.0 *1*		2651.6	$^-$	1371.6	(7^-)			

[†] From 1977Mo01, except where noted.
[‡] From 1977Mo01, given relative to Iγ(691γ)=100.
[#] From $\gamma(\theta)$ in 1977Mo01.
[@] Placement of transition in the level scheme is uncertain.

^{68}**Zn(α,pnγ)** **1977Mo01**

Level Scheme

Intensities: Relative I_γ

Legend

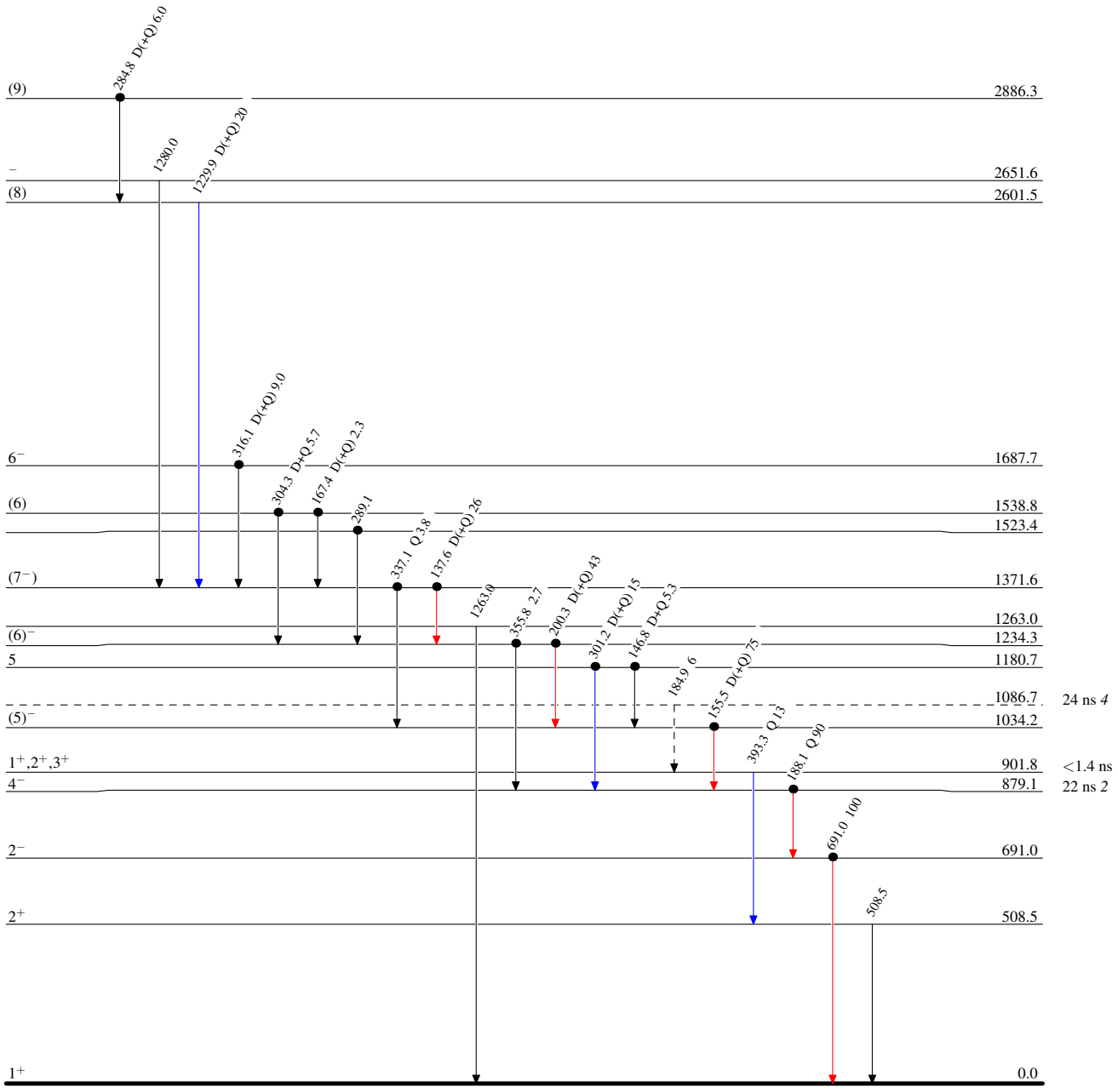
$I_\gamma < 2\% \times I_\gamma^{max}$

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

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

γ Decay (Uncertain)

Coincidence



$^{70}_{31}Ga_{39}$