^{68}Zn(α,nγ) 1974Fo12,1976Eb02,1977Ke16

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 188,1 (2023)	17-Jan-2023

1974Fo12: E=14.2 MeV α beam from the 80-cm cyclotron in Stockholm. Measured Eγ, yield function, $\gamma(\theta)$, $\gamma\gamma(\theta)$, γ(lin pol) with Ge(Li) detectors. Deduced levels, J, π, γ-ray multipolarities, mixing mixing ratios. The convention of Rose and Brink is used for the mixing ratio.

1976Eb02, 1975EbZZ: E=12.5 and 16 MeV α beams from the 7.5-MV tandem accelerator of the Universitat zu Koln. Target was 200 μg/cm^2, self-supporting, 90% enriched ^{68}Zn. Measured Eγ, Iγ, $\gamma(\theta)$, γ(lin pol), $T_{1/2}$ by DSA, with a Ge(Li) detector. Deduced levels, γ-ray multipolarities, mixing ratios, branching ratios.

1977Ke16: E=8, 8.5 MeV α beams from the McMaster University accelerator. Targets were 1.4 mg/cm^2 (>98%) enriched ^{68}Zn backed on 12.7 μm gold foil or 2.5 mg/cm^2 ^{68}Zn backed on 12.7 μm gold foil. Measured Eγ, Iγ, $\gamma(\theta)$, angular triple correlations with Ge(Li) detectors at five angles in addition to a 90° monitor detector. Deduced levels, J, π and mixing ratios. Levels up to 1298 keV studied. Statistical model analysis.

Other:

1973Ha09: E=13 MeV α beam from the 7-MV pulsed Van de Graaff at the Hahn-Meitner Institut in Berlin. Target was Natural Zn. Measured quadrupole moment ratios for 5/2$^-$ level in ^{71}Ge and 9/2$^+$ states in ^{67}Ge and ^{69}Ge.

^{71}Ge Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0	1/2$^-$		
174.9 *1*	5/2$^-$	84 ns	$T_{1/2}$: from 1973Ha09.
198.1 *1*	9/2$^+$	20.22 ms *12*	%IT=100 $T_{1/2}$: from the Adopted Levels. E(level): transitions from this 20-ms isomeric state were not observed in these studies. The level energy is taken from 1971Mu14.
500.1 *1*	3/2$^-$		J$^\pi$: $\gamma(\theta)$ gives unique assignment of J=3/2 (1977Ke16).
525.0 *2*	5/2$^+$		J$^\pi$: 5/2, 7/2 from $\gamma(\theta)$ to 5/2, 9/2; 7/2 ruled out from $\gamma(\theta)$ to 3/2 (1977Ke16).
589.5 *3*	7/2$^+$		J$^\pi$: 5/2, 7/2 from $\gamma(\theta)$ (1977Ke16); 7/2$^+$ preferred from yield function analysis (1974Fo12).
708.0 *1*	3/2$^-$		J$^\pi$: 1/2,3/2 from $\gamma(\theta)$ of 533γ and 708γ (1977Ke16).
747.3 *2*	5/2$^-$		J$^\pi$: $\gamma(\theta)$ of all three gammas from this level are consistent with 5/2 assignment (1977Ke16).
807.8 *4*	1/2$^-$		J$^\pi$: 1/2, 3/2 from $\gamma(\theta)$; 3/2 ruled out from $\gamma\gamma(\theta)$ of 308γ, 500γ, cascade (1977Ke16).
831.3 *2*	3/2$^-$		J$^\pi$: $\gamma(\theta)$ of 831γ gives a unique assignment of J=3/2 (1977Ke16).
1026.5 *2*	5/2$^-$		J$^\pi$: 5/2 from $\gamma(\theta)$ of 526γ (1977Ke16).
1037.5 *4*	9/2$^+$		J$^\pi$: (7/2,9/2) from $\gamma(\theta)$; yield function data favor J=9/2 (1974Fo12).
1096.1 *5*	3/2$^-$		E(level): the 1096.1 and 1096.3 levels reported elsewhere (1974Ma32) are not resolved in experiments with this reaction (1977Ke16).
1096.3 *2*	7/2$^-$		J$^\pi$: (7/2) from $\gamma(\theta)$ of 921γ. 8% of the line is estimated to be from the 1096.1 level (1977Ke16).
1139.4 *5*	3/2$^-$		
1172.1 *4*	13/2$^+$	0.87[#] ps *17*	J$^\pi$: 13/2$^+$; from $\gamma(\theta)$ and π from polarization data of 974γ (1974Fo12) confirmed by the $\gamma(\theta)$ and polarization data of 1976Eb02.
1191.7 *4*	11/2$^+$	0.90[#] ps *18*	J$^\pi$: 11/2$^+$; from $\gamma(\theta)$ and π from polarization data (1974Fo12,1976Eb02).
1205.0 *3*	5/2$^+$		J$^\pi$: 3/2,5/2 from $\gamma(\theta)$ of 374γ (1977Ke16).
1212.2 *4*	5/2$^-$		J$^\pi$: 3/2, 5/2 from $\gamma(\theta)$ of 712γ; $\gamma\gamma(\theta)$ of 712γ, 500γ cascade excludes 3/2 (1977Ke16).
1288.5 *4*	1/2$^-$		
1297.9 *2*	3/2$^-$		J$^\pi$: 3/2, 1/2 from $\gamma(\theta)$ of 1298γ; 3/2 more probable (1977Ke16).
1349.1 *6*	1/2$^+$		
1377.4 *4*	(1/2$^-$)		
1406.7 *4*	7/2$^-$		
1422.3 *2*	9/2$^-$	1.01[#] ps *20*	J$^\pi$: 9/2 from $\gamma(\theta)$ and π from polarization data of 1247γ.
1476.8 *4*	11/2$^+$	0.54[#] ps *10*	J$^\pi$: $\gamma(\theta)$ of 1278γ gives a unique assignment of J=11/2 (1974Fo12). $T_{1/2}$: weighted average of 0.52 ps *10* and 0.57 ps *11* (1976Eb02).

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^{68}Zn(α,nγ) 1974Fo12,1976Eb02,1977Ke16 (continued)

^{71}Ge Levels (continued)

E(level)[†]	Jπ[‡]	Comments
1542.3 *5*	$(1/2^+,3/2^-)$	
1558.5 *11*	$5/2^+$	
1565.9 *6*	$(5/2^-,7/2^+)$	
1598.5 *5*	$3/2^-$	
1697.3 *4*	$(9/2)^+$	Jπ: probable 7/2 to 11/2 from yield function (1974Fo12).
1949.4 *4*		
1959.1 *5*	$13/2^+$	Jπ: 11/2,13/2 from the yield function and γ(θ) (1974Fo12).
2298.4 *5*	$17/2^+$	Jπ: 17/2 from γ(θ) and yield function (1974Fo12).
2313.6 *5*	$15/2^+$	Jπ: 15/2 from γ(θ) and yield function (1974Fo12).
2349.1 *4*	$13/2^-$	Jπ: 13/2 from γ(θ) (1976Eb02).
3679.1?		This level is not reported in ^{74}Ge(α,α3nγ) study; not included in the Adopted Levels.

[†] From a least-squares fit to the Eγ data.
[‡] From Adopted Levels; supporting arguments from this reaction are indicated.
[#] From DSA in 1976Eb02; values should be considered as upper limits since no feeding corrections have been made. Total uncertainty in the lifetime measurement is ≈30%.

γ(^{71}Ge)

A_2 and A_4 coefficients are from 1977Ke16 at Eα=8.5 MeV, unless otherwise indicated.

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[&]	δ[&]	Comments
174.9	$5/2^-$	174.9[‡] *1*	100.0 *6*	0.0	$1/2^-$			
500.1	$3/2^-$	500.0 *1*	100	0.0	$1/2^-$	D+Q		A_2=−0.08 *3*; A_4=−0.02 *3*; A_2=−0.10 *3*; A_4=+0.04 *2* (1977Ke16) δ: +0.12 *12* or +2.4 *+11−7* from γ(θ) (1977Ke16). First set of γ(θ) data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16).
525.0	$5/2^+$	326.8[‡] *1*	100.0[@] *6*	198.1	$9/2^+$	Q(+O)	−0.08 *+9−11*	A_2=+0.17 *3*; A_4=−0.05 *3* (1974Fo12) A_2=+0.12 *2*; A_4=−0.03 *3*; A_2=+0.09 *2*; A_4=+0.01 *2* (1977Ke16) δ: from γ(θ) (1974Fo12). First set of γ(θ) data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16).
		350.0[‡] *2*	13.4[@] *6*	174.9	$5/2^-$	D+Q		A_2=+0.23 *4*; A_4=−0.14 *4*; A_2=+0.20 *3*; A_4=0.00 *4* (1977Ke16) δ: +0.21 *13* or −2.2 *+4−7* from γ(θ) (1977Ke16). First set of γ(θ) data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16).
589.5	$7/2^+$	391.4[‡] *1*	100 *1*	198.1	$9/2^+$	D+Q	−0.25 *6*	A_2=+0.15 *2*; A_4=−0.02 *3*; A_2=+0.13 *2*; A_4=+0.02 *2* (1977Ke16) A_2=+0.19 *2*; A_4=−0.03 *2* (1974Fo12) δ: −0.34 *14* (1974Fo12); −0.23 *+5−6* or −2.9 *+5−8* (1977Ke16); weighted average of −0.23 *6* (1977Ke16) and −0.34 *14* (1974Fo12). First set of γ(θ) data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16).
708.0	$3/2^-$	533.1	4.7[@] *8*	174.9	$5/2^-$			A_2=+0.06 *8*; A_4=+0.01 *9* (1977Ke16)

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^{68}Zn(α,nγ) 1974Fo12,1976Eb02,1977Ke16 (continued)

$\gamma(^{71}Ge)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[&]	δ[&]	Comments
708.0	3/2$^-$	708.0 *1*	100.0[@] *8*	0.0	1/2$^-$	D+Q		A_2=+0.03 *3*; A_4=−0.08 *5*; A_2=+0.01 *2*; A_4=+0.02 *2* (1977Ke16) δ: +0.27 *11* or −3.7 *+11−26* (1977Ke16). First set of $\gamma(\theta)$ data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16).
747.3	5/2$^-$	247.5 *3*	75 *3*	500.1	3/2$^-$			A_2=−0.51 *3*; A_4=+0.02 *2*; A_2=−0.43 *2*; A_4=−0.02 *1* (1977Ke16) I_γ: weighted average of 76 *2* (1975EbZZ) and 66 *5* (1977Ke16). δ: −2.14 to −0.07 (1977Ke16). First set of $\gamma(\theta)$ data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16). A_2=+0.31 *6*, A_4=−0.05 *7* for (247γ)(500γ)(θ) (1977Ke16).
		572.3 *3*	100 *4*	174.9	5/2$^-$	D+Q		A_2=+0.31 *3*; A_4=−0.02 *4*; A_2=+0.26 *2*; A_4=+0.05 *3* (1977Ke16) δ: +1.3 *+4−3* or 0.00 *18* (1977Ke16). First set of $\gamma(\theta)$ data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16). I_γ: 100 *4* (1977Ke16).
		747.3 *3*	49 *5*	0.0	1/2$^-$			A_2=+0.42 *5*; A_4=−0.17 *6*; A_2=+0.34 *3*; A_4=+0.01 *3* (1977Ke16) I_γ: unweighted average of 44 *3* (1975EbZZ) and 54.6 *24* (1977Ke16). First set of $\gamma(\theta)$ data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16).
807.8	1/2$^-$	307.9 *5*	75[@] *3*	500.1	3/2$^-$	D+Q		A_2=−0.15 *3*; A_4=+0.03 *4*; A_2=−0.08 *3*; A_4=+0.10 *6* (1977Ke16) δ: +0.09 to +2.7 (1977Ke16). First set of $\gamma(\theta)$ data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16). A_2=−0.32 *10*, A_4=+0.02 *12*; A_2=+0.32 *10*, A_4=+0.08 *11* for (308γ)(500γ)(θ) (1977Ke16) in two geometries.
		632.9	54[@] *3*	174.9	5/2$^-$			A_2=+0.09 *8*; A_4=−0.24 *10* (1977Ke16)
		807.8 *4*	100[@] *4*	0.0	1/2$^-$			A_2=−0.03 *5*; A_4=−0.02 *5*; A_2=−0.07 *4*; A_4=+0.12 *5* (1977Ke16) First set of $\gamma(\theta)$ data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16).
831.3	3/2$^-$	241.8	2.3[@] *3*	589.5	7/2$^+$			
		306.2 *5*	28.5[@] *18*	525.0	5/2$^+$	D+Q	>+0.19	A_2=−0.24 *3*; A_4=−0.01 *4*; A_2=−0.21 *2*; A_4=−0.03 *2* (1977Ke16) First set of $\gamma(\theta)$ data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16). A_2=−0.14 *5*, A_4=+0.02 *6*; A_2=+0.03 *5*, A_4=+0.01 *6* for (306γ)(327γ)(θ) (1977Ke16) in two geometries.
		331.4 *3*	20.1[@] *15*	500.1	3/2$^-$	D+Q	<−0.19	A_2=+0.14 *6*; A_4=+0.03 *7*; A_2=+0.10 *4*; A_4=+0.01 *5* (1977Ke16) δ: from 1977Ke16. First set of $\gamma(\theta)$ data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16).
		831.3 *3*	100.0[@] *21*	0.0	1/2$^-$			A_2=−0.16 *3*; A_4=−0.02 *3* (1977Ke16) δ: 0.00 *21* or −1.7 *+5−10* (1977Ke16).

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^{68}Zn(α,nγ) 1974Fo12,1976Eb02,1977Ke16 (continued)

$\gamma(^{71}Ge)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[&]	δ[&]	Comments
1026.5	5/2$^-$	279.2		747.3	5/2$^-$			I_γ: not measured since this γ ray is obscured by an impurity.
		526.4 *3*	100[@] *4*	500.1	3/2$^-$	D+Q	−0.5 *+4−6*	A_2=−0.65 *4*; A_4=−0.05 *4*; A_2=−0.63 *2*; A_4=+0.02 *2* (1977Ke16) δ: from 1977Ke16. First set of $\gamma(\theta)$ data at Eα=8.0 MeV, second at 8.5 MeV (1977Ke16). A_2=−0.65 *4*, A_4=+0.03 *3*; A_2=−0.30 *4*, A_4=+0.01 *4* for (526γ)(500γ)(θ) (1977Ke16) in two geometries.
		851.6	27[@] *4*	174.9	5/2$^-$			
		1026.6 *3*	34[@] *4*	0.0	1/2$^-$			
1037.5	9/2$^+$	448.1 *1*	45[@] *3*	589.5	7/2$^+$	D+Q	+0.49 *+5−6*	A_2=+0.31 *2*; A_4=−0.02 *1* (1974Fo12) E_γ: from $\gamma\gamma$ coincidence (1974Fo12). δ: from $\gamma(\theta)$ (1974Fo12). Iγ(448)/Iγ(840)=16/28 (1974Fo12).
		839.5[‡] *1*	100[@] *3*	198.1	9/2$^+$	D+Q	+0.4 *+1−3*	Mult.,δ: ΔJ=0 transition from A_2=+0.52 *5*, A_4=−0.05 *5* (1974Fo12).
1096.1	3/2$^-$	348.8		747.3	5/2$^-$			
		1096.1 *5*	100 *13*	0.0	1/2$^-$			
1096.3	7/2$^-$	596.2 *3*	100 *9*	500.1	3/2$^-$			
		921.4 *3*	96 *8*	174.9	5/2$^-$	D+Q	−2.0 *4*	A_2=−0.66 *6*; A_4=+0.17 *7*; A_2=−0.63 *2*; A_4=+0.18 *3* (1977Ke16) δ: from 1977Ke16. I_γ: 8% of the 921γ line is estimated to be from the 1096.1 level (1977Ke16). In the level scheme of 1977Ke16, the transition connects the unresolved 1096 keV level with the 198 keV rather than the 175 keV. First set of $\gamma(\theta)$ for Eα=8.0 MeV, second for 8.5 MeV (1977Ke16).
1139.4	3/2$^-$	431.4	<2.4[@]	708.0	3/2$^-$			
		639.3	8.6[@] *24*	500.1	3/2$^-$			
		964.5	12[@] *3*	174.9	5/2$^-$			
		1139.4 *5*	100[@] *4*	0.0	1/2$^-$			
1172.1	13/2$^+$	974.2[‡] *1*	100 *4*	198.1	9/2$^+$	E2		B(E2)↓≤0.075 *15* A_2=+0.32 *1*; A_4=−0.10 *1*; pol=+0.69 *29* (1974Fo12) A_2=+0.29 *3*; A_4=−0.11 *5*; pol=+0.35 *8* (1976Eb02) Mult.: from γ(lin pol) (1974Fo12,1976Eb02). δ(M3/E2)=−0.01 *2* (1974Fo12); −0.04 *4* (1976Eb02).
1191.7	11/2$^+$	993.9[‡] *1*	100 *4*	198.1	9/2$^+$	M1+E2	+1.25 *21*	B(E2)↓≤0.034 *12*; B(M1)↓≤0.021 *7* A_2=+0.63 *1*; A_4=+0.16 *1*; pol=−0.64 *33* (1974Fo12) A_2=+0.65 *3*; A_4=0.13 *5*; pol=−0.78 *9* (1976Eb02) δ: +1.45 *+14−18* (1974Fo12); +1.04 *2* (1976Eb02). Adopted δ from unweighted average of the two values.

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^{68}Zn(α,nγ) 1974Fo12,1976Eb02,1977Ke16 (continued)

$\gamma(^{71}Ge)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[&]	δ[&]	Comments
1205.0	5/2$^+$	373.8 *3*	20[@] *4*	831.3	3/2$^-$			δ: <−0.36 or 0.00 *14* (1977Ke16).
		615.5[‡] *2*	100[@] *6*	589.5	7/2$^+$			
		680.0	13[@] *4*	525.0	5/2$^+$			
1212.2	5/2$^-$	464.9	25[@] *8*	747.3	5/2$^-$			
		504.2	31[@] *12*	708.0	3/2$^-$			
		712.2 *5*	73[@] *10*	500.1	3/2$^-$			A_2=+0.48 *8*; A_4=+0.04 *9* (1977Ke16) δ: −2.5 to −0.12 (1977Ke16). A_2=−0.48 *4*, A_4=+0.06 *4*; A_2=−0.23 *7*, A_4=−0.12 *8* for (712γ)(500γ)(θ) (1977Ke16) in two geometries.
		1037.0 *10*	47[@] *10*	174.9	5/2$^-$			
		1212.3 *5*	100[@] *11*	0.0	1/2$^-$			
1288.5	1/2$^-$	788.5 *3*	100 *19*	500.1	3/2$^-$			
1297.9	3/2$^-$	797.6 *4*	36 *11*	500.1	3/2$^-$			
		1298.0 *3*	100 *16*	0.0	1/2$^-$	D+Q		A_2=−0.15 *4*; A_4=−0.02 *4* (1977Ke16) δ: −0.12 *+10−11* or −2.0 *+5−7* (1977Ke16).
1349.1	1/2$^+$	517.8 *5*	100 *17*	831.3	3/2$^-$			
1377.4	(1/2$^-$)	1202.5 *5*	100 *17*	174.9	5/2$^-$			
		1377.3 *6*	60 *11*	0.0	1/2$^-$			
1406.7	7/2$^-$	659.4 *3*	100 *11*	747.3	5/2$^-$			
1422.3	9/2$^-$	675.1 *3*	23 *3*	747.3	5/2$^-$			
		1247.3 *3*	100 *6*	174.9	5/2$^-$	E2(+M3)	−0.06 *6*	B(E2)↓≤0.015 *4* A_2=+0.24 *4*; A_4=−0.04 *6*; pol=+0.75 *40* (1976Eb02) Mult.,δ: from $\gamma(\theta)$ and polarization data (1976Eb02).
1476.8	11/2$^+$	887.4[‡] *1*	86 *6*	589.5	7/2$^+$	E2		B(E2)↓≤0.095 *22* A_2=+0.38 *9*; A_4=−0.04 *9* (1974Fo12) A_2=+0.25 *3*; A_4=−0.13 *5* (1976Eb02) Iγ(887)/Iγ(1278)=17/18 (1974Fo12) is in agreement with adopted value. δ(O/Q)=+0.07 *11* from $\gamma(\theta)$ (1974Fo12); −0.07 *+4−5* from $\gamma(\theta)$ (1976Eb02). I_γ: other: Iγ(887)/Iγ(1278)=50 *2*/50 *2* (1976Eb02).
		1278.5[‡] *1*	100 *9*	198.1	9/2$^+$	M1+E2	+4.8 *10*	B(E2)↓≤0.015 *4*; B(M1)↓≤0.001 *1* A_2=+0.21 *3*; A_4=+0.29 *4* (1974Fo12) A_2=+0.29 *5*; A_4=+0.22 *7* (1976Eb02) δ: weighted average of +6.9 *+20−13* from $\gamma(\theta)$ (1974Fo12), and +4.4 *+6−7* from $\gamma(\theta)$ (1976Eb02). Other: 0.4 from 1976Eb02.
1542.3	(1/2$^+$,3/2$^-$)	1017.3 *4*	100 *14*	525.0	5/2$^+$			
1558.5	5/2$^+$	1034.2[‡] *2*	100 *13*	525.0	5/2$^+$			
1565.9	(5/2$^-$,7/2$^+$)	976.3 *6*		589.5	7/2$^+$			
		1041.0 *10*	100 *67*	525.0	5/2$^+$			
1598.5	3/2$^-$	1098.5 *5*	100 *31*	500.1	3/2$^-$			
1697.3	(9/2)$^+$	1108.5[‡] *7*	100 *4*	589.5	7/2$^+$			
1949.4		853.1 *3*	100 *7*	1096.3	7/2$^-$			
1959.1	13/2$^+$	767.4[‡] *1*	72 *9*	1191.7	11/2$^+$			A_2=+0.58 *11*; A_4=+0.22 *11* (1974Fo12)

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^{68}Zn(α,nγ) 1974Fo12,1976Eb02,1977Ke16 (continued)

$\gamma(^{71}Ge)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[&]	δ[&]	Comments
								δ: +0.50 *+14−28* for J(1959)=11/2, +2.0 *+5−10* for J(1959)=13/2 from $\gamma(\theta)$ (1974Fo12).
1959.1	13/2$^+$	786.8[a] *3*	100 *19*	1172.1	13/2$^+$			Placement is uncertain in 1974Fo12; a 786.9γ is placed from this level in (α,α3nγ) (2022Wa21).
		1761[a]		198.1	9/2$^+$			Uncertain γ shown only in level scheme figure 11 of 1974Fo12; a 1760.9γ is placed from this level in (α,α3nγ) (2022Wa21).
2298.4	17/2$^+$	1126.6[‡] *1*	100 *20*	1172.1	13/2$^+$	Q(+O)	0.00 *+6−7*	A_2=+0.33 *6*; A_4=−0.09 *5* (1974Fo12) δ: from $\gamma(\theta)$ (1974Fo12).
2313.6	15/2$^+$	1122.0[‡] *2*	100 *14*	1191.7	11/2$^+$	Q(+O)	−0.06 *+5−4*	A_2=+0.30 *6*; A_4=−0.15 *5* (1974Fo12)
		1141.0[a] *10*	70 *30*	1172.1	13/2$^+$			
2349.1	13/2$^-$	926.8 *3*	100 *13*	1422.3	9/2$^-$	Q(+O)	0.00 *5*	A_2=+0.33 *3*; A_4=−0.18 *7* (1976Eb02) δ(O/Q)=0.00 *5* from $\gamma(\theta)$.
3679.1?		1365.2[a] *6*	100 *30*	2313.6	15/2$^+$			This γ is not reported in ^{74}Ge(α,α3nγ) study; not included in the Adopted Levels, Gammas dataset.

[†] From 1975EbZZ, except where noted otherwise.
[‡] Weighted average of values from 1975EbZZ and 1974Fo12.
[#] Relative photon branching from each level based on the data of 1975EbZZ measured at θ=90° for Eα=12.5 MeV, unless indicated otherwise. 1974Fo12 give relative gamma intensities for 18 γ rays.
[@] From branching ratios in 1977Ke16.
[&] From $\gamma(\theta)$ data as given under comments.
[a] Placement of transition in the level scheme is uncertain.

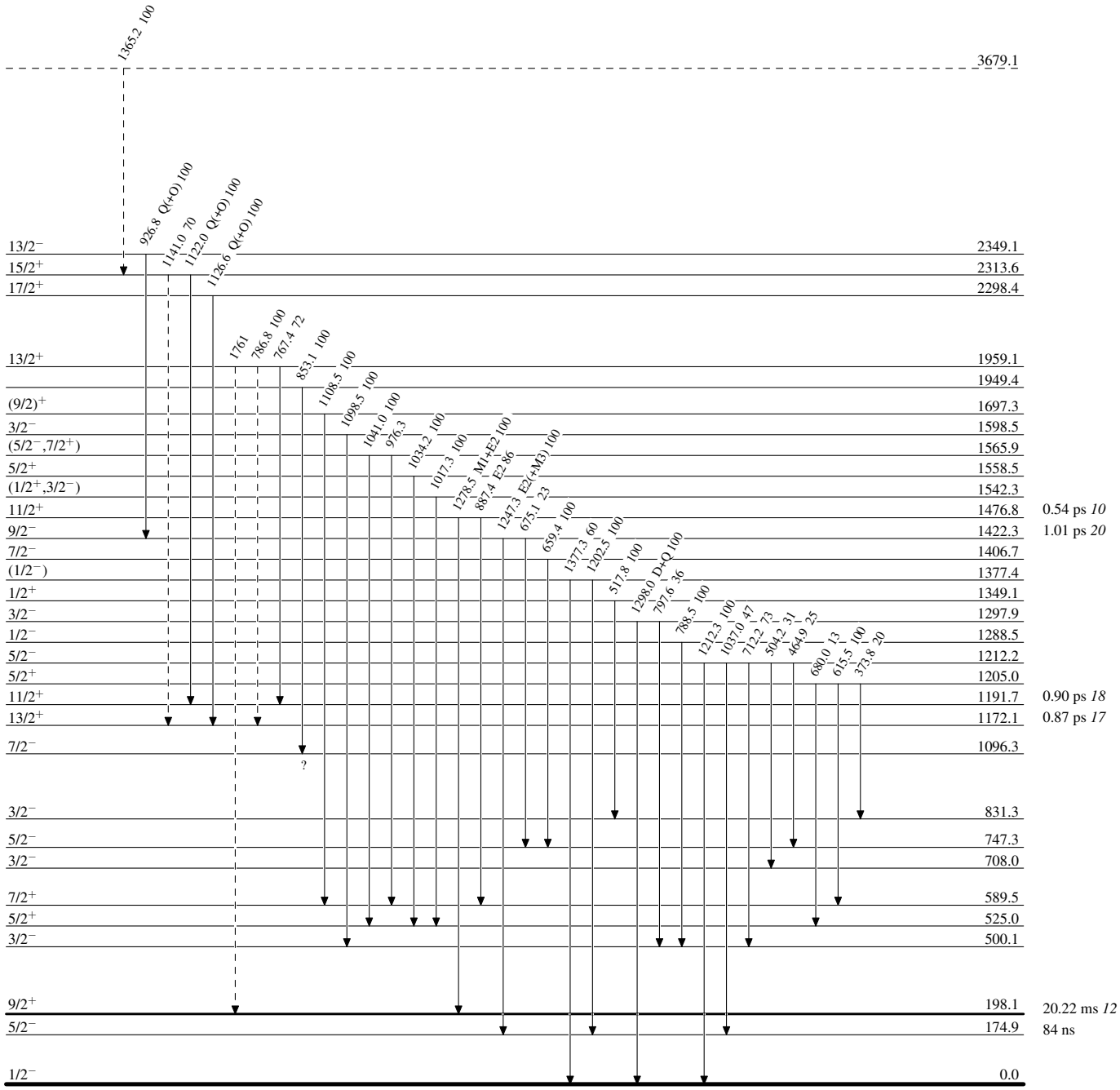
^{68}Zn(α,nγ) **1974Fo12,1976Eb02,1977Ke16**

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

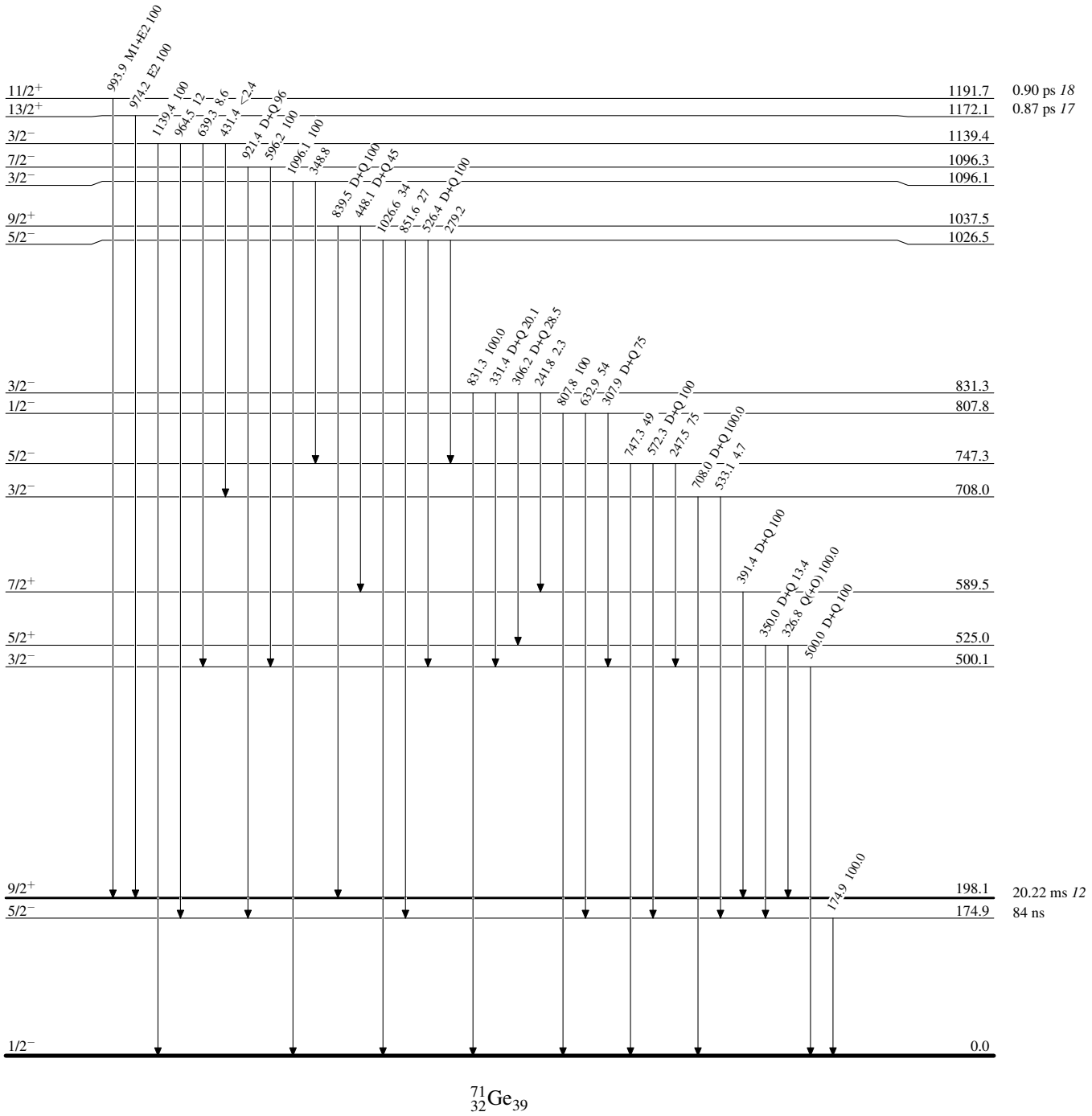


$^{71}_{32}Ge_{39}$

^{68}Zn(α,nγ) **1974Fo12,1976Eb02,1977Ke16**

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{71}_{32}Ge_{39}$