^{62}Ni(α,nγ) 1974Ni01,1978Ne02,1978Ko11

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Also include data of ^{56}Fe(^{12}C,2pnγ) from 1975ChYJ and 1978Ne02.

1974Ni01: Eα≈14 MeV from Reseach Institute for Physics, Stockholm. Target was 0.5-1.0 mg/cm^2 isotopically enriched ^{62}Ni. γ rays were detected with Ge(Li) detectors. Measured Eγ, Iγ, γγ-coin, γγ(θ), γ(lin pol). Deduced levels, J, π, γ-ray multipolarities, mixing ratios.

1978Ne02: Eα=14-24 MeV from Notre Dame FN tandem. Target was 1.0 mg/cm^2 ^{62}Ni. γ rays were detected with two Ge(Li) detectors. Measured Eγ, Iγ, γγ-coin, γ(θ). Deduced levels, J, π, γ-ray multipolarities, mixing ratios. Comparisons with available data. 1978Ne02 also measured γγ-coin with ^{56}Fe(^{12}C,2pnγ), but no details are given.

1978Ko11: Eα=8.0-14.0 MeV from Oliver Lodge Laboratory. Same setup as 1977Lo03. Measured Eγ, Iγ, γγ-coin, γ(θ), γ(lin pol), Doppler-shift attenuation. Deduced levels, J, π, $T_{1/2}$, γ-ray branching ratios, multipolarities, mixing ratios.

1977Lo03: Eα=6.5-17 MeV from Oliver Lodge Laboratory at University of Liverpool. Target was 98.7% enriched ^{62}Ni. γ rays were detected with a three-Ge(Li) Compton polarimeter and an escape-suppressed spectrometer. Measured Eγ, Iγ, γγ-coin, γ(θ), γ(lin pol), Doppler-shift attenuation. Deduced levels, J, π, $T_{1/2}$, γ-ray branching ratios, multipolarities, mixing ratios.

1975We08,1975We21: Eα=8.5 and 14 MeV from McMaster FN tandem. Target was isotopically enriched Ni metal. γ rays were detected with two Ge(Li) detectors. Measured γ(θ,H,t) and γ(θ). Deduced g-factors, γ-ray mixing ratios.

1977Ch14: Eα=8.2 MeV from the Lyon University 4 MV Van de Graaff accelerator. Target was 99.5% enriched ^{62}Ni. γ rays were detected with a Ge(Li) detector. Measured Eγ, Iγ, Doppler-shift attenuation. Deduced levels, $T_{1/2}$. 1977Ch14 also report data on ^{65}Cu(p,nγ) A 20% uncertainty in stopping power theory is already included by the authors in $T_{1/2}$ results.

1975ChYJ: ^{56}Fe(^{12}C,2pnγ) (probably); measured γ yields, γγ coincidences and γ(θ); no details of results but level scheme is given.

^{65}Zn Levels

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	Comments
0	5/2⁻		
53.83 *17*	1/2⁻		
115.04 *13*	3/2⁻		J^π: spin=3/2 from γ(θ) 1975We08 and 1974Ni01. g-factor=−0.47 *12* from γ(θ,H,t) (IPAD) in 1975We08. See Adopted Levels for adopted μ=−0.8 *2* deduced from an adjusted g-factor by 2020StZV evaluation, based on this original value in 1975We08.
206.86 *17*	3/2⁻		J^π: spin=3/2 from γ(θ) in 1975We08 and 1974Ni01. g−factor=+0.44 *15* from γ(θ,H,t) (IPAD) in 1975We08. See Adopted Levels for adopted μ=+0.7 *3* deduced from an adjusted g-factor by 2020StZV evaluation, based on this original value in 1975We08.
768.52 *14*	5/2⁻	1.31 ps *+69−42*	J^π: 5/2⁻ from γ(θ) and polarization in 1978Ko11; 5/2 from γ(θ) in 1974Ni01. $T_{1/2}$: from DSAM in 1977Ch14 at Eα=8.2 MeV. Other: >1.4 ps from 1978Ko11 at Eα=10.0 MeV.
864.19 *10*	7/2⁻	3.4 ps *+42−17*	J^π: 7/2⁻ from γ(θ) and polarization in 1978Ko11; 7/2⁻ from γ(θ), polarization and yield in 1974Ni01. $T_{1/2}$: from 1977Ch14 at Eα=8.2 MeV. Other: >1.4 ps at Eα=10.0 MeV (1978Ko11).
867	1/2⁻	0.69 ps *+35−21*	E(level): from 1977Ch14. $T_{1/2}$: from DSAM in 1977Ch14 at Eα=8.2 MeV.
909.5 *3*	3/2⁻	1.41 ps *+69−42*	J^π: 3/2⁻ from γ(θ) and polarization (1978Ko11); J=3/2 from yield (1974Ni01). $T_{1/2}$: weighted mean of 1.32 ps *+69−42* at Eα=8.2 MeV (1977Ch14) and 1.52 ps *+73−52* at Eα=10.0 MeV (1978Ko11).
1047.2 *5*	5/2⁻	0.38 ps *11*	J^π: 5/2⁻ from γ(θ) and polarization (1978Ko11). $T_{1/2}$: weighted mean of 0.56 ps *+24−16* at Eα=8.2 MeV (1977Ch14) and 0.33 ps *11* at Eα=10.0 MeV (1978Ko11).
1065.49 *14*	9/2⁺	>1.4[a] ps	J^π: 9/2⁺ from γ(θ) and polarization (1977Lo03); J=9/2 from γ(θ) (1974Ni01). $T_{1/2}$: note that RUL=1 for B(M2)(W.u.) of 1066γ with Mult=M2+E3 and δ=−0.13 *2* from γ(lin pol) requires $T_{1/2}$>0.14 ns. g-factor=−0.35 *10* from γ(θ,H,t) (IPAD) in 1975We21. See Adopted Levels for adopted

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^{62}Ni(α,nγ) 1974Ni01,1978Ne02,1978Ko11 (continued)

^{65}Zn Levels (continued)

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	Comments
			μ=1.1 *2* deduced from an adjusted g-factor by 2020StZV evaluation, based on this original value in 1975We21. Additional information 1.
1252.6 *3*	7/2$^-$	1.6[&] ps +*8*−*6*	J$^\pi$: 7/2$^-$ from $\gamma(\theta)$ and polarization (1978Ko11); J=7/2 from $\gamma(\theta)$ and yield (1974Ni01).
1263.41 *20*	9/2$^-$	>1.4[&] ps	J$^\pi$: 9/2$^-$ from $\gamma(\theta)$ and polarization (1978Ko11,1974Ni01).
1343.8 *3*	5/2$^-$	>1.4[&] ps	J$^\pi$: 5/2$^-$ from $\gamma(\theta)$ and polarization (1978Ko11). E(level): from 1978Ko11.
1368.96 *24*	5/2$^+$	>1.4[a] ps	J$^\pi$: 5/2$^+$ from $\gamma(\theta)$ and polarization (1977Lo03); J=5/2 from $\gamma(\theta)$ and yield (1974Ni01).
1469.7 *4*	3/2$^-$	125[&] fs *58*	J$^\pi$: 3/2$^-$ from $\gamma(\theta)$ and polarization (1978Ko11). E(level): from 1978Ko11.
1576.9 *4*	3/2$^-$	173[&] fs *48*	J$^\pi$: 3/2$^-$ from $\gamma(\theta)$ and polarization (1978Ko11). E(level): from 1978Ko11.
1588.1 *4*	7/2$^-$	152[&] fs *62*	J$^\pi$: 7/2$^-$ from $\gamma(\theta)$ and polarization (1978Ko11). E(level): from 1978Ko11.
1907.3 *5*	(9/2)		J$^\pi$: spin=(9/2) from $\gamma(\theta)$ and γ yields (1974Ni01).
1958	7/2$^+$	0.42[a] ps *11*	J$^\pi$: 7/2$^+$ from $\gamma(\theta)$ and polarization (1977Lo03). E(level): from 1977Lo03.
2053.8 *3*	13/2$^+$	>1.4[a] ps	J$^\pi$: 13/2$^+$ from $\gamma(\theta)$ and polarization (1977Lo03,1974Ni01).
2135	9/2$^+$	>1.4[a] ps	E(level): from 1977Lo03. J$^\pi$: 9/2$^+$ from $\gamma(\theta)$ and polarization (1977Lo03).
2137.6 *4*	11/2$^+$	0.67[a] ps *18*	J$^\pi$: 11/2$^+$ from $\gamma(\theta)$ and polarization (1977Lo03); J=11/2 from $\gamma(\theta)$ and yield (1974Ni01,1978Ne02).
2301.9 *5*			
2923.1 *4*	13/2$^{(+)}$		J$^\pi$: spin=13/2 from $\gamma(\theta)$ and γ yields (1974Ni01).
2931.8 *9*	(13/2$^-$)		J$^\pi$: spin=(13/2) from $\gamma(\theta)$ (1978Ne02).
3227.7 *5*	17/2$^+$		J$^\pi$: >13/2 from 1173 γ yield (1978Ne02) and J=13/2, 15/2 from observation of γ yield in ^{63}Cu(α,npγ)^{65}Zn at E=24-31 MeV (1974Ni01).
3336.8? *6*			
3472.6 *4*	(15/2$^+$)		J$^\pi$: spin=(15/2) from $\gamma(\theta)$ and yield (1978Ne02).
3714?			E(level): from 1978Ne02.
3785.5 *6*	17/2$^{(+)}$		J$^\pi$: spin=(17/2) from $\gamma(\theta)$ and yield (1978Ne02).
4079.2 *5*	(17/2$^+$)		
4625.0 *7*			
4888.0 *10*			
4938.2 *10*	(21/2$^+$)		
5067.5 *8*	(19/2)		J$^\pi$: from $\gamma(\theta)$ (1978Ne02), inconsistent with (21/2$^+$) in Adopted Levels.
5414.1 *8*	(21/2)		J$^\pi$: from $\gamma(\theta)$ and yield (1978Ne02), inconsistent with (23/2$^+$) in Adopted Levels.
5773?[@]			
6847?[@]			
8003?[@]			

† From a least-squares fit to γ-ray energies, unless otherwise noted.

‡ From Adopted Levels, unless otherwise noted. Supporting arguments from this dataset based on $\gamma(\theta)$, γ-linear polarization and γ-ray yields are given in comments where available.

From DSAM in 1977Ch14, 1977Lo03 and 1978Ko11, as noted. For values as quoted from 1978Ko11 and 1977Lo03, a 25% uncertainty in the stopping power as stated by those authors is not included in the original uncertainties in those references and have been added in quadrature by evaluator. Original uncertainties reported in 1977Ch14 already include a 20% uncertainty in stopping power.

@ From 1975ChYJ.

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^{62}Ni(α,nγ) 1974Ni01,1978Ne02,1978Ko11 (continued)

^{65}Zn Levels (continued)

[&] From DSAM in 1978Ko11, at Eα=10.0 MeV.
[a] From DSAM in 1977Lo03.

γ(^{65}Zn)

Relative intensities I_{rel} under comments are from 1974Ni01, relative to I_{rel}=100 for 864γ.
For pol values in comments, positive value indicates electric character and negative value for magnetic character.

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	Comments
53.8 *2*		53.83	1/2⁻	0	5/2⁻			
61.1 *2*		115.04	3/2⁻	53.83	1/2⁻	D+Q		Mult.,δ: D+Q and δ(Q/D)=+0.07 *5* or −2.0 *3* from analysis of $\gamma(\theta)$ and prediction of alignment from compound nuclear statistical model (1975We08). A_2=−0.18 *1*, A_4=+0.47 *10* (1975We08), consistent with ΔJ=1, but not with ΔJ=0.
115.1 *2*		115.04	3/2⁻	0	5/2⁻	D+Q	−0.18 *6*	Mult.,δ: from $\gamma(\theta)$ in 1974Ni01. Others: −0.07 *2* or −3.5 *3* (1975We08). A_2=−0.01 *1*, A_4=+0.47 *10* (1975We08). A_2=+0.032 *4*, A_4=+0.002 *4* (1974Ni01). I_{rel}=23.
153.0 *2*	73.8	206.86	3/2⁻	53.83	1/2⁻	D+Q	+0.11 *3*	Mult.,δ: D+Q from $\gamma(\theta)$, with 0<δ(Q/D)<+0.17 in 1974Ni01, +0.11 *3* or −2.3 *2* in 1975We08, based on which δ=+0.11 *3* is adopted here. A_2=−0.15 *1*, A_4=+0.50 *10* (1975We08). A_2=−0.059 *9*, A_4=+0.005 *10* (1974Ni01). I_{rel}=15.
201.4 *1*	89.5 *55*	1065.49	9/2⁺	864.19	7/2⁻	E1(+M2)[b]	0.00[b] *1*	E_γ: weighted average of 201.3 *1* (1974Ni01) and 201.6 *2* (1978Ne02). I_γ: unweighted average of 95 *1* (1977Lo03) and 84 *4* (1978Ne02). δ: others: +0.04 *2* (1978Ne02), 0.00 *1* (1974Ni01). A_2=−0.22 *1*, A_4=−0.02 *2* (1977Lo03). A_2=−0.19 *1*, A_4=−0.03 *1* (1978Ne02). A_2=−0.184 *3*, A_4=0.000 *4* (1974Ni01). POL=+0.35 *1* (1977Lo03). I_{rel}=63.
206.9 *2*	26.1	206.86	3/2⁻	0	5/2⁻	D+Q	+0.27 *3*	Mult.,δ: D+Q from $\gamma(\theta)$, with +0.3<δ(Q/D)<+0.8 in 1974Ni01, +0.27 *3* or <−50 or >+7.5 in 1975We08, based on which δ=+0.27 *3* is adopted here. A_2=−0.21 *1*, A_4=+0.50 *10* (1975We08). A_2=−0.118 *10*, A_4=−0.009 *13* (unreliable data, 1974Ni01). I_{rel}=5.3.
346.6 *3*		5414.1	(21/2)	5067.5	(19/2)	(D+Q)	+0.04 *+2−5*	A_2=−0.25 *2*, A_4=+0.04 *2* (1978Ne02).
399 *3*	7 *1*	1263.41	9/2⁻	864.19	7/2⁻	D+Q	−0.023 *10*	E_γ: from $\gamma\gamma$-coin spectra (1974Ni01). Mult.,δ: from $\gamma(\theta)$ in 1978Ko11. A_2=−0.31 *2*, A_4=+0.004 *24* (1978Ko11).
484.0 *3*	19 *1*	1252.6	7/2⁻	768.52	5/2⁻	M1+E2[a]	+0.03[a] *1*	%branching: 19 *1* (1978Ko11). δ: other: +0.07 *10* from 1974Ni01.

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^{62}Ni(α,nγ) 1974Ni01,1978Ne02,1978Ko11 (continued)

γ(^{65}Zn) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	Comments
								A_2=−0.21 *1*, A_4=−0.008 *12* (1978Ko11). A_2=−0.099 *25*, A_4=−0.003 *33* (1974Ni01). I_{rel}=2.5.
557.6 *3*	34 *8*	3785.5	17/2$^{(+)}$	3227.7	17/2$^+$			A_2=+0.36 *5* (1978Ne02).
561	3 *1*	768.52	5/2$^-$	206.86	3/2$^-$			E_γ: not reproted in 1974Ni01 .
588[@]	21[@] *1*	1958	7/2$^+$	1368.96	5/2$^+$	M1+E2[b]	+0.11[b] *1*	A_2=±0.093 *2*, A_4=+0.01 *2* (1977Lo03). POL=+0.13 *4* (1977Lo03).
606.2 *4*	57 *14*	4079.2	(17/2$^+$)	3472.6	(15/2$^+$)			
654	33 *1*	768.52	5/2$^-$	115.04	3/2$^-$	M1+E2	−0.29 *15*	Mult.,δ: D+Q from $\gamma(\theta)$, with δ=−0.14 *12* from 1974Ni01 and −0.43 *4* from 1978Ko11. Unweighted average of two δ values is adopted here. E1+M2 is ruled out by RUL. A_2=−0.55 *1*, A_4=+0.018 *8* (1978Ko11). A_2=−0.355 *36*, A_4=−0.022 *58* (1974Ni01). I_{rel}=9.2.
703	7 *1*	909.5	3/2$^-$	206.86	3/2$^-$			
715	11 *1*	768.52	5/2$^-$	53.83	1/2$^-$			E_γ: not reported in 1974Ni01.
749.2 *2*	18.5 *45*	864.19	7/2$^-$	115.04	3/2$^-$	E2		E_γ: weighted average of 749.1 *2* (1974Ni01) and 749.5 *3* (1978Ne02). I_γ: unweighted average of 14 *2* (1978Ne02) and 23 *1* (1978Ko11). Mult.,δ: Q+D with δ=+0.04 *3* from $\gamma(\theta)$ in 1974Ni01, but M2, E3 or M3 components are ruled out by RUL. A_2=+0.331 *13*, A_4=−0.055 *14* (1974Ni01). I_{rel}=15.
752		867	1/2$^-$	115.04	3/2$^-$			E_γ: used for DSAM measurement in 1977Ch14.
768.4 *2*	53 *1*	768.52	5/2$^-$	0	5/2$^-$	M1+E2	+0.35 *6*	Mult.,δ: D+Q from $\gamma(\theta)$, with δ=+0.51 *10-28* from 1974Ni01 and +0.33 *6* from 1978Ko11. Weighted average of two δ values is adopted here. A_2=+0.38 *2*, A_4=−0.054 *21* (1978Ko11). A_2=−0.428 *9*, A_4=+0.045 *30* (1974Ni01). I_{rel}=16.
785.6 *3*	32 *4*	2923.1	13/2$^{(+)}$	2137.6	11/2$^+$	D+Q	+0.6 *2*	E_γ: weighted average of 785.7 *3* (1978Ne02) and 785.5 *3* (1974Ni01). Mult.,δ: from $\gamma(\theta)$ in 1974Ni01. A_2=+0.443 *67*, A_4=+0.030 *70* (1974Ni01). I_{rel}=2.5.
795	23 *1*	909.5	3/2$^-$	115.04	3/2$^-$	M1+E2[a]	+0.40[a] *12*	A_2=+0.24 *1*, A_4=−0.017 *13* (1978Ko11).
819	10 *1*	1588.1	7/2$^-$	768.52	5/2$^-$	M1+E2[a]	−0.23[a] *3*	A_2=−0.62 *3*, A_4=+0.09 *4* (1978Ko11).
835[&c]		5773?		4938.2	(21/2$^+$)			
856	22 *1*	909.5	3/2$^-$	53.83	1/2$^-$	M1+E2[a]	−0.96[a] *20*	A_2=−0.26 *1*, A_4=+0.046 *14* (1978Ko11).
864.5 *4*	81.5 *45*	864.19	7/2$^-$	0	5/2$^-$	M1+E2	−2.22 *5*	E_γ: unweighted average of 864.1 *1* (1974Ni01) and 864.8 *3* (1978Ne02). I_γ: unweighted average of 86 *2* (1978Ne02) and 77 *1* (1978Ko11). Mult.,δ: D+Q from $\gamma(\theta)$, with δ=−2.27 *3* from 1974Ni01 and −2.17 *4* from

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^{62}Ni(α,nγ) 1974Ni01,1978Ne02,1978Ko11 (continued)

γ(^{65}Zn) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	Comments
								1978Ko11. unweighted average is taken here. A_2=−0.57 *1*, A_4=+0.20 *1* (1978Ko11). A_2=−0.494 *5*, A_4=+0.148 *7* (1974Ni01). POL=+0.16 *7* (1974Ni01). I_{rel}=100.
870[c]		2923.1	13/2$^{(+)}$	2053.8	13/2$^+$			Reported in 1975ChYJ only.
892[@]	79[@] *1*	1958	7/2$^+$	1065.49	9/2$^+$	M1+E2[b]	−0.27[b] *1*	A_2=+0.19 *1*, A_4=−0.01 *1* (1977Lo03). POL=−0.36 *10* (1977Lo03).
909.5 *3*	48 *1*	909.5	3/2$^-$	0	5/2$^-$	M1+E2[a]	+0.25[a] *4*	A_2=−0.10 *1*, A_4=−0.001 *10* (1978Ko11). I_{rel}=2.5.
932.1 *5*	62 *2*	1047.2	5/2$^-$	115.04	3/2$^-$	M1+E2[a]	−0.42[a] *5*	Member of an unresolved γ doublet (1974Ni01). A_2=−0.55 *1*, A_4=−0.020 *15* (1978Ko11). I_{rel}=5.7.
987.9 *2*	100	2053.8	13/2$^+$	1065.49	9/2$^+$	E2(+M3)	+0.01 *2*	E_γ: weighted average of 988.2 *3* (1978Ne02) and 987.8 *2* (1974Ni01). I_γ: from 1977Lo03. Mult.,δ: from γ(θ) and γ(lin pol) in 1974Ni01. A_2=+0.40 *1*, A_4=−0.21 *1* (1977Lo03). A_2=+0.413 *25*, A_4=−0.132 *20* (1974Ni01). POL=+0.52 *8* (1977Lo03), +0.5 *3* (1974Ni01). I_{rel}=30.
1046 *1*	61 *4*	1252.6	7/2$^-$	206.86	3/2$^-$			Member of an unresolved γ doublet (1974Ni01). I_{rel}<18.
1047.2 *10*	38 *2*	1047.2	5/2$^-$	0	5/2$^-$			Member of an unresolved γ doublet (1974Ni01).
1066.1 *4*	10.5 *55*	1065.49	9/2$^+$	0	5/2$^-$	M2+E3[b]	−0.13[b] *2*	E_γ: weighted average of 1065.5 *8* (1974Ni01) and 1066.2 *4* (1978Ne02). I_γ: unweighted average of 5 *1* (1977Lo03) and 16 *4* (1978Ne02). A_2=+0.25 *2*, A_4=−0.23 *2* (1977Lo03). A_2=+0.24 *1*, A_4=+0.04 *1* (1978Ne02). POL=−0.19 *11* (1977Lo03).
1069[c]		2135	9/2$^+$	1065.49	9/2$^+$			E_γ: from 1977Lo03. I_γ: not given in 1977Lo03.
1072.0 *4*	100	2137.6	11/2$^+$	1065.49	9/2$^+$	M1+E2	+0.71 *7*	E_γ: weighted average of 1072.4 *4* (1978Ne02) and 1071.7 *3* (1974Ni01). I_γ: from 1977Lo03. Mult.: from γ(θ) and γ(lin pol) in 1977Lo03; also D+Q from γ(θ) in 1974Ni01 and 1978Ne02. δ: weighted average +1.4 *+2−6* (1974Ni01), +0.67 *5* (1977Lo03), and +0.84 *10* (1978Ne02). A_2=+0.50 *1*, A_4=+0.03 *1* (1977Lo03). A_2=+0.57 *1*, A_4=+0.05 *1* (1978Ne02). A_2=+0.601 *19*, A_4=+0.135 *22* (1974Ni01). POL=−0.79 *3* (1977Lo03). I_{rel}=16.
1074[&c]		6847?		5773?				

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^{62}Ni(α,nγ) 1974Ni01,1978Ne02,1978Ko11 (continued)

γ(^{65}Zn) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	Comments
1137	15 *1*	1343.8	5/2⁻	206.86	3/2⁻			Member of an unresolved γ triplet (1978Ko11).
1138 *1*	20 *4*	1252.6	7/2⁻	115.04	3/2⁻			Member of an unresolved γ doublet (1974Ni01) or γ triplet (1978Ko11). I_{rel}<9.0.
1138.7 *4*		1907.3	(9/2)	768.52	5/2⁻			E_γ: weighted average of 1138.8 *4* (1978Ne02) and 1138 *1* (1974Ni01). Member of an unresolved γ doublet (1974Ni01) or γ triplet (1978Ko11). A_2=+0.317 *55*, A_4=−0.050 *59* (1974Ni01). I_{rel}<9.0.
1156[&c]		8003?		6847?				An 1156.5γ 5 is placed from the 4080 level by 1978Ne02.
1156.5 *5*	43 *14*	4079.2	(17/2⁺)	2923.1	13/2⁽⁺⁾			A_2=−0.2 *1*, A_4=+0.2 *1* (1978Ne02).
1173.4 *4*	<21	3227.7	17/2⁺	2053.8	13/2⁺	(E2)		E_γ: weighted average of 1173.5 *4* (1978Ne02) and 1173 *1* (1974Ni01). Member of an unresolved γ doublet (1974Ni01); member of a triplet (1978Ne02). Mult.: $\gamma(\theta)$ and polarization of this complex line were consistent with an E2 assignment (1974Ni01). A_2=+0.27 *1*, A_4=−0.10 *1* (1978Ne02). A_2=+0.347 *31*, A_4=+0.044 *33* (1974Ni01).
1199[c]		3336.8?		2137.6	11/2⁺			Reported in 1975ChYJ only.
1229	64 *2*	1343.8	5/2⁻	115.04	3/2⁻	M1+E2	−0.33 *3*	A_2=−0.52 *1*, A_4=+0.005 *10* (1978Ko11).
1253.9 *2*	>60	1368.96	5/2⁺	115.04	3/2⁻	E1+M2[b]	−0.04[b] *1*	I_γ: from 1977Lo03. δ: other: −0.12 *11* from $\gamma(\theta)$ in 1974Ni01. A_2=−0.264 *7*, A_4=−0.01 *1* (1977Lo03). A_2=−0.376 *42*, A_4=+0.077 *66* (1974Ni01). POL=+0.28 *3* (1977Lo03). I_{rel}=7.3.
1263.4 *2*	93 *1*	1263.41	9/2⁻	0	5/2⁻	E2(+M3)	+0.03 *3*	Mult.,δ: from $\gamma(\theta)$ and γ(lin pol) in 1974Ni01. Other: δ=−0.045 *20* (1978Ko11). A_2=+0.33 *1*, A_4=−0.17 *1* (1978Ko11). A_2=+0.323 *16*, A_4=0.060 *17* (1974Ni01). POL=+0.5 *5* (1974Ni01). I_{rel}=36.
1271		2135	9/2⁺	864.19	7/2⁻	E1+M2[b]	−0.06[b] *1*	E_γ: from 1977Lo03. I_γ: >13 (1977Lo03). A_2=−0.19 *1*, A_4=+0.01 *2* (1977Lo03). POL=+0.45 *9* (1977Lo03).
1282.0[c] *5*		3336.8?		2053.8	13/2⁺			
1282.0 *5*		5067.5	(19/2)	3785.5	17/2⁽⁺⁾	(D+Q)	−0.07 *9*	A_2=−0.46 *4*, A_4=+0.14 *5* (1978Ne02).
1334.8 *5*	68 *6*	3472.6	(15/2⁺)	2137.6	11/2⁺	(Q+(O))	−0.00 *6*	A_2=+0.44 *3*, A_4=−0.26 *3* (1978Ne02).
1344	21 *1*	1343.8	5/2⁻	0	5/2⁻			
1354	70 *3*	1469.7	3/2⁻	115.04	3/2⁻	M1+E2[a]	+2.1[a] *3*	A_2=+0.20 *1*, A_4=+0.019 *13* (1978Ko11).
1368.9	<40	1368.96	5/2⁺	0	5/2⁻			I_γ: from 1977Lo03.
1370	39 *3*	1576.9	3/2⁻	206.86	3/2⁻			

Continued on next page (footnotes at end of table)

^{62}Ni(α,nγ) 1974Ni01,1978Ne02,1978Ko11 (continued)

γ(^{65}Zn) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	Comments
1397.3 *5*		4625.0		3227.7	17/2$^+$			A_2=−0.90 *2*, A_4=+0.50 *2* (1978Ne02).
1414	28 *2*	1469.7	3/2$^-$	53.83	1/2$^-$	M1+E2[a]	+0.24[a] *5*	A_2=−0.002 *19*, A_4=−0.034 *25* (1978Ko11).
1418.5 *5*	32 *6*	3472.6	(15/2$^+$)	2053.8	13/2$^+$	(D+Q)	+0.8 *4*	A_2=+0.81 *3*, A_4=+0.07 *3* (1978Ne02).
1470[c]	<5	1469.7	3/2$^-$	0	5/2$^-$			I_γ: from 2 *3* in 1978Ko11.
1473	22 *2*	1588.1	7/2$^-$	115.04	3/2$^-$			
1522	29 *2*	1576.9	3/2$^-$	53.83	1/2$^-$	M1+E2[a]	−2.5[a] *3*	A_2=−0.073 *12*, A_4=−0.003 *15* (1978Ko11).
1533.4 *4*		2301.9		768.52	5/2$^-$			E_γ: from 1978Ne02.
1575[c]		3714?		2137.6	11/2$^+$			E_γ: from 1978Ne02. A_2=+0.10 *4*, A_4=+0.06 *5* (1978Ne02).
1577	32 *2*	1576.9	3/2$^-$	0	5/2$^-$			
1588	68 *2*	1588.1	7/2$^-$	0	5/2$^-$	M1+E2[a]	+0.31[a] *2*	A_2=+0.20 *1*, A_4=−0.004 *12* (1978Ko11).
1660.3 *8*		4888.0		3227.7	17/2$^+$			A_2=+0.39 *5* (1978Ne02).
1668.4 *8*		2931.8	(13/2$^-$)	1263.41	9/2$^-$	(Q+O)	−0.07 *5*	E_γ: from 1978Ne02. Other: 1668 *3* (1974Ni01). A_2=+0.30 *2*, A_4=+0.16 *2* (1978Ne02).
1710.5 *8*		4938.2	(21/2$^+$)	3227.7	17/2$^+$			A_2=+0.53 *2*, A_4=−0.09 *3* (1978Ne02).
1733.0 *8*	66 *8*	3785.5	17/2$^{(+)}$	2053.8	13/2$^+$	(Q+(O))	0.00 *5*	A_2=+0.42 *2*, A_4=−0.16 *3* (1978Ne02).
1857.5 *5*	68 *4*	2923.1	13/2$^{(+)}$	1065.49	9/2$^+$			E_γ: from 1978Ne02.
1906.7[c] *8*		1907.3	(9/2)	0	5/2$^-$			E_γ: from 1978Ne02.

† Values with uncertainties are from 1974Ni01 up to 1969, from 1978Ne02 above 3336 level, and others in between are from average of values from both references, unless otherwise noted; values without uncertainties are from 1978Ko11, unless otherwise noted.

‡ Quoted values are branching ratios from 1978Ko11 up to 1588 level, from 1978Ne02 above that up to 4079 level for values with uncertainties, and those without uncertainties are deduced by the evaluator from relative intensities in 1974Ni01 as given under comments, unless otherwise noted.

From 1978Ne02 for levels above 2923; for other levels, see comments at individual levels for arguments.

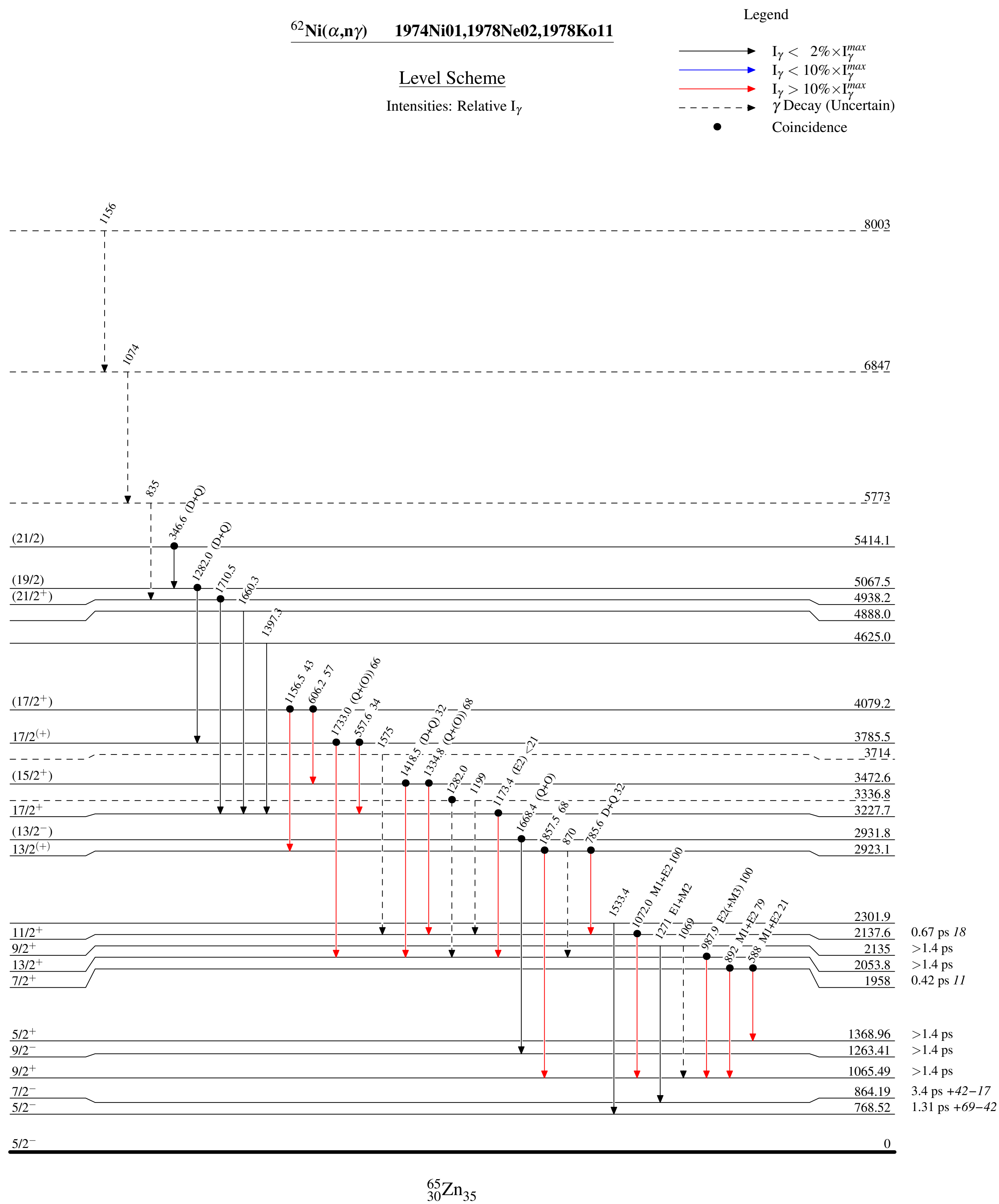
@ From 1977Lo03.

& From 1975ChYJ.

a D+Q and δ from $\gamma(\theta)$ in 1978Ko11; E1+M2 ruled out by RUL.

b From $\gamma(\theta)$ and γ(lin pol) in 1977Lo03.

c Placement of transition in the level scheme is uncertain.



^{62}Ni(α,nγ) 1974Ni01,1978Ne02,1978Ko11
Level Scheme
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγmax
Iγ < 10%×Iγmax
Iγ > 10%×Iγmax
γ Decay (Uncertain)
Coincidence
8003
6847
5773
(21/2) 5414.1
(19/2) 5067.5
(21/2+) 4938.2
4888.0
4625.0
(17/2+) 4079.2
17/2(+) 3785.5
3714
(15/2+) 3472.6
3336.8
17/2+ 3227.7
(13/2−) 2931.8
13/2(+) 2923.1
2301.9
11/2+ 2137.6 0.67 ps 18
9/2+ 2135 >1.4 ps
13/2+ 2053.8 >1.4 ps
7/2+ 1958 0.42 ps 11
5/2+ 1368.96 >1.4 ps
9/2− 1263.41 >1.4 ps
9/2+ 1065.49 >1.4 ps
7/2− 864.19 3.4 ps +42−17
5/2− 768.52 1.31 ps +69−42
5/2− 0
1156
1074
835
346.6 (D+Q)
1282.0 (D+Q)
1710.5
1660.3
1397.3
1156.5 43
606.2 57
1733.0 (Q+(O)) 66
557.6 34
1575
1418.5 (D+Q) 32
1334.8 (Q+(O)) 68
1282.0
1199
1173.4 (E2) <21
1668.4 (Q+O)
1857.5 68
870
785.6 D+Q 32
1533.4
1072.0 M1+E2 100
1271 E1+M2
1069
987.9 E2(+M3) 100
892 M1+E2 79
588 M1+E2 21
$^{65}_{30}Zn_{35}$

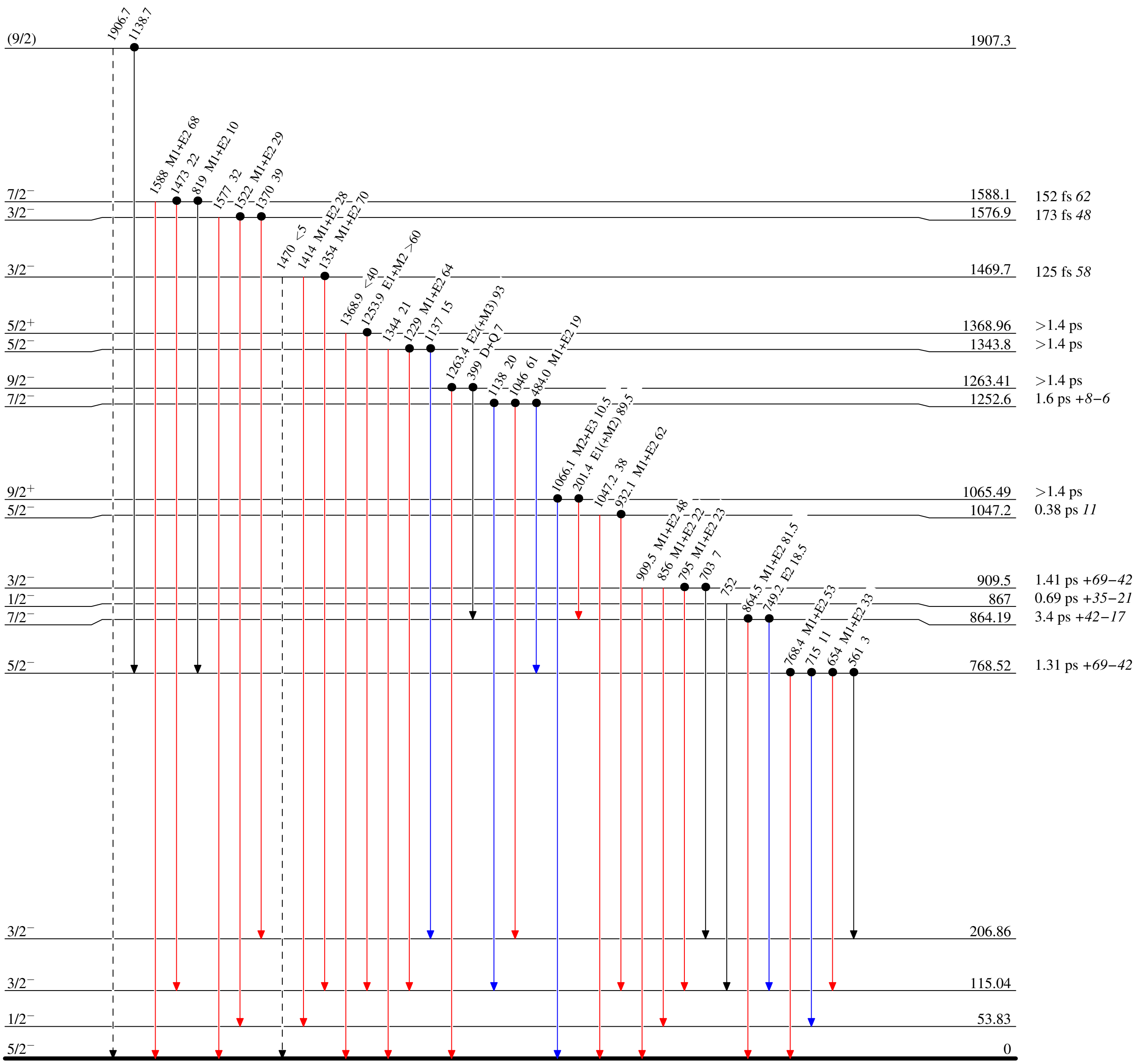
^{62}Ni(α,nγ) 1974Ni01,1978Ne02,1978Ko11

Level Scheme (continued)

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



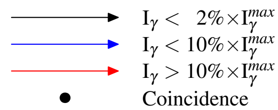
$^{65}_{30}Zn_{35}$

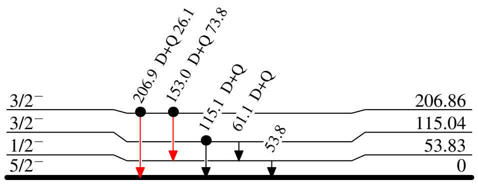
^{62}Ni(α,nγ) 1974Ni01,1978Ne02,1978Ko11

Level Scheme (continued)

Intensities: Relative I_γ

Legend





$^{65}_{30}Zn_{35}$