Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Huang Xiaolong, and Wang Xianghan	NDS 204,1 (2025)	30-Jun-2023

Q(β^-)=−3958.9 *5*; S(n)=10595.7 *3*; S(p)=11137.2 *7*; Q(α)=−7016.1 *4* 2021Wa16
S(2n)=18415.8 *3*, S(2p)=19911 *3* (2021Wa16).
^{62}Ni isotope identified in mass spectroscopic data by 1934As04.
Other Reactions:
2016Mo15: ^{116}Sn(^{60}Ni,^{62}Ni),E=245 MeV. Measured Ni-like fragments using PRISMA spectrometer, and γ rays using AGATA demonstrator array of highly segmented Ge detectors at Legnaro accelerator facility. A weak peak at 1173 keV seen, corresponding to transition from the first 2^+ state, with deduced yield of <0.00145. No evidence was found for the population of the 2340, 4^+ level.
^{63}Cu(γ,p): 1975We11, 1971We06, 1968Ab10; g.s. and first 2^+ levels.
^{65}Zn(n,α): 1984Em01: E=thermal, FWHM=50-60 keV, measured $\sigma(\theta)$ for g.s. and first 2^+ level.
^{66}Zn(d,^{6}Li): 1973Ce02: E=27.25 MeV, Si telescopes, FWHM=400 keV, $\sigma(\theta)$ for g.s. and first 2^+ state.

Theoretical structure calculations:
2022Ba29: calculated rms charge radii, isotope shifts using Skyrme and D1MTd Gogny effective interactions.
2022Ga13: analyzed experimental investigations of multiple nuclear shape coexistence.
2022Ko04: calculated ground state energy, charge rms radius using coupled cluster (CC) and ab-initio density functional theory.
2022Ku16: calculated potential energy surface, binding energy, S(2n), charge, neutron and proton rms radii, neutron skin thickness using Skyrme parameterizations.
2021Hu26: calculated energies of the lowest bands based on the $\nu g^2_{9/2}$ configuration, root mean square angular momentum components along the medium, short, and long axes of the rotor, valence neutrons, and total angular momentum, probability density profiles for the orientation of the angular momentum on the plane for the doublet bands using covariant density functional theory and quantum particle rotor model; suggested transverse wobbling in ^{62}Ni.
2020So01: calculated total binding energy, S(2n), rms charge radius using state-of-the-art no-core shell model and self-consistent Green′s function approaches with NN+3N interaction.
2015Co17: calculated energies of three-phonon levels, B(E2), anharmonic vibrators using leading order (LO) and next-to-leading-order (NLO) effective field theory (EFT) for nuclear vibrations, with Bayesian statistics for quantification of theoretical uncertainties.
2015Fr06: calculated energy levels, J^π, B(E2), signatures for triaxiality using triaxial projected shell Model.
Other 33 theoretical structure references from 2018-2022 are listed ‘document’ records in this dataset. Retrieval of the NSR database shows other 230 primary theory references from 1970-2017 related to structure of ^{62}Ni.
Additional information 1.

^{62}Ni Levels

Cross Reference (XREF) Flags

A	^{62}Co β^- decay (1.54 min)	L	^{60}Ni(^{18}O,^{16}Oγ)	W	^{62}Ni(α,α')
B	^{62}Co β^- decay (13.86 min)	M	^{61}Ni(n,γ) E=thermal	X	Coulomb excitation
C	^{62}Cu ε decay (9.672 min)	N	^{61}Ni(n,γ):resonances	Y	^{63}Cu(n,d)
D	^{26}Mg(^{48}Ca,2α4nγ)	O	^{61}Ni(d,p),(pol d,p)	Z	^{63}Cu(n,npγ)
E	^{48}Ca(^{18}O,4nγ)	P	^{62}Ni(γ,γ')	Others:	
F	^{58}Fe(^{6}Li,d)	Q	^{62}Ni(e,e′)	AA	^{63}Cu(d,^{3}He),(pol d,^{3}He)
G	^{58}Fe(^{16}O,^{12}C)	R	^{62}Ni(n,n′γ)	AB	^{63}Cu(^{6}Li,^{7}Be),(^{9}Be,^{10}B)
H	^{59}Co(α,pγ)	S	^{62}Ni(p,p′),(pol p,p′)	AC	^{64}Ni(p,t)
I	^{60}Ni(t,p),(pol t,p)	T	^{62}Ni(p,p′γ)	AD	^{64}Zn(^{14}C,^{16}O)
J	^{60}Ni(α,^{2}He)	U	^{62}Ni(d,d′),(pol d,d′)	AE	^{65}Cu(p,α)
K	^{60}Ni(^{12}C,^{10}C),(^{14}C,^{12}C),	V	^{62}Ni(^{3}He,^{3}He′),(^{3}He,dp)	AF	^{66}Zn(α,2α)

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[&]	XREF	Comments
0.0[a]	0$^+$	stable	ABCDEFGHIJKLM OPQRSTUVWXYZ	XREF: Others: AA, AB, AC, AD, AE, AF Evaluated rms charge radius $<r^2>^{1/2}$=3.8399 fm *21* (2013An02). Evaluated $\delta<r^2>$(^{60}Ni,^{62}Ni)=0.211 fm^2 *7* (2013An02). Measured $\delta<r^2>$(^{62}Ni,^{58}Ni)=+0.5000 fm^2 *48*; $\delta<r^2>$(^{62}Ni,^{60}Ni)=+0.2266 fm^2 *48*; $\delta<r^2>$(^{64}Ni,^{62}Ni)=+0.1365 fm^2 *48* (2021Ko18, collinear laser spectroscopy using BECOLA facility at NSCL-MSU). Measured $\delta<r^2>$(^{60}Ni,^{62}Ni)=+0.223 fm^2 *5*; deduced total charge radius R$_c$(^{62}Ni)=3.835 fm *2* (2022Ma04,2020Ka22, collinear laser spectroscopy at ISOLDE-CERN). Measured isotope shift $\delta\nu$(^{62}Ni,^{58}Ni)=+1010.6 MHz *24*, $\delta\nu$(^{62}Ni,^{60}Ni)=+504.4 MHz *27*, $\delta\nu$(^{64}Ni,^{62}Ni)=+524.7 MHz *26* (2021Ko18, collinear laser spectroscopy using BECOLA facility at NSCL-MSU). Measured isotope shift $\delta\nu$(^{60}Ni,^{62}Ni)=+503.9 MHz *25*(stat) *39*(syst) (2022Ma04,2020Ka22, collinear laser spectroscopy at ISOLDE-CERN). 2012Sc01 deduced valence orbit neutron occupancy as follows from summed experimental spectroscopic factors in their study of ^{62}Ni(p,d) reaction: 2.31 each for 1p$_{3/2}$ and 0f$_{5/2}$, 0.93 for 1p$_{1/2}$, 0.34 for 0g$_{9/2}$ with a total of 5.89.
1172.91[a] *3*	2$^+$	1.442 ps *21*	ABCDEFGHIJKLM OPQRSTUVWXYZ	XREF: Others: AA, AB, AC, AD, AE, AF μ=+0.33 *5* (2001Ke02,2019StZV) Q=+0.05 *12* (1974Le13,2021StZZ) B(E2)↑=0.0885 *30* μ: transient-field integral PAC (2001Ke02). Others: μ=+0.68 *14* (1988Sp04), +0.64 *22* (1978Ha13). Q: reorientation in Coul. ex. (1974Le13). J$^{\pi}$: E2 γ to g.s.; L(p,t)=L(t,p)=2. T$_{1/2}$: mean lifetime τ=2.08 ps *3* is weighted average of 14 values from different methods listed as comments below. Individual values of mean lifetime τ in ps as used in the averaging procedures are given below: 1. Deduced from BE2↑ measurement in Coulomb excitation: 2.25 *45* (1960An07, earlier value of 1.40 *35* in 1959Al95), 2.23 *22* (1962St02), 2.20 *13* (1969Ha31), 2.05 *6* (1970Le17), 2.09 *7* (1971ChZF), 2.03 *8* (2014Al20). 2. From Γ in (γ,γ'): 2.15 *42* (1981Ca10, also 2.1 *5* in 1977Ca14 from the same group as 1981Ca10). 3. From B(E2) in (e,e′): 2.096 *27* (1967Du07), 1.82 *18* (1975DeXW). Value of 2.99 *20* from 1972Li28 is not as it appears discrepant. 4. From DSAM in (α,pγ): 1.55 *25* (1978Ke11, also 1978KlZR), 1.6 *+4−6* (1978Oh04). 5. From DSAM in (n,n′γ): 1.79 *+86−48* (2011Ch05), 6. From DSAM in Coulomb excitation: 2.28 *18* (1965Es01), 2.01 *12* (2001Ke08), uncertainty increased

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[&]	XREF	Comments
				to 0.12 to include 5% systematic uncertainty due to stopping powers, as suggested by one of the authors of 2001Ke08 in an e-mail communication to evaluators, December 2007. B(E2)↑: from Coulomb excitation.
2048.55 *8*	0^+	1.40 ps *51*	C F HI kLM OP RSTU W	XREF: Others: AA, AC, AE XREF: W(2020) J^{π}: L(t,p)=L(p,t)=0. $T_{1/2}$: weighted average of 1.8 ps *+19−6* (DSAM in (n,n′γ)) and 0.76 ps *+76−28* (DSAM in (α,pγ)). In 2022Ki03 evaluation of E0 data, $T_{1/2}$=0.76 ps *+76−28* is listed.
2301.85 *7*	2^+	0.64 ps *14*	ABC F HI k M OPQRST Vw Z	XREF: Others: AA, AC, AE, AF J^{π}: L(p,t)=L(t,p)=2; E2 γ to g.s. $T_{1/2}$: weighted average of 0.67 ps *+20−14* (DSAM in (n,n′γ)) and 0.60 ps *14* (DSAM in (α,pγ)). In 2022Ki03 evaluation of E0 data, $T_{1/2}$=0.67 ps *+20−14* is listed.
2336.46[a] *9*	4^+	0.88 ps *21*	B DEFGHIJk M O RSTUVwXYZ	XREF: Others: AA, AC, AE, AF XREF: T(2330) J^{π}: L(p,t)=L(t,p)=4. $T_{1/2}$: weighted average of 0.86 ps *+41−22* (DSAM in n,n′γ) and 0.89 ps *21* (DSAM in (α,pγ)). Other: <2 ps from RDM in (^{18}O,4nγ).
2890.63 *15*	0^+	>3.1 ps	C FGHI LM O RSTU	XREF: Others: AC, AE J^{π}: L(p,t)=0. $T_{1/2}$: from DSAM in (α,pγ).
3058.79 *12*	$(2)^+$	2.3 ps *+14−7*	A HI M O RST W Z	XREF: Others: AA, AC, AE XREF: I(3041?)T(3050)W(3030) J^{π}: 2^+ from L(p,t)=L(α,α′)=2, and L(d,p)=1 from $3/2^-$ target (implying $J^{\pi}=0^+,1^+,2^+$). However, γ(θ) for the 722.2γ to 4^+ with large negative A_2 coefficient in (n,n′γ) is inconsistent with 2^+, suggesting J=3; the γ(θ) data for the other two transitions to 2^+ levels are consistent with J=2 or 3. $J^{\pi}=2^+$, in contrast to 3^+ is also favored from population of low-lying states with natural-parity (i.e. S=0) in (p,t) reaction. It would seem that 722γ(θ) data in (n,n′γ) need re-investigation. $T_{1/2}$: from DSAM in (α,pγ).
3157.95 *12*	2^+	0.62 ps *+11−10*	A C F HI M OP RSTU W Y	XREF: Others: AC, AE $T_{1/2}$: from (n,n′γ). Other: 0.69 ps *+55−28* in (α,pγ). J^{π}: L(p,t)=L(t,p)=2.
3177.0 *3*	4^+	0.73 ps *17*	B DE H RS	XREF: Others: AC, AE J^{π}: L(p,t)=4. $T_{1/2}$: from DSAM in (α,pγ).
3257.66 *18*	2^+	0.71 ps *17*	A C gH j M RST	XREF: Others: AC, AE J^{π}: L(p,t)=2. $T_{1/2}$: from DSAM in (α,pγ).
3260.2 *13*	(2^+)&(4^+)		Fg Ij S	XREF: Others: AE J^{π}: from L(t,p)=(2+4) for unresolved doublet. E(level): may include 3270 level.
3270.18 *19*	$1^+,2^+$	0.125 ps *14*	A C g j M OP R	XREF: Others: AE

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$&	XREF	Comments
				Jπ: primary γ from $1^-,2^-$ capture state in (n,γ); L(d,p)=1+3 from $3/2^-$ target; 1221.0 γ to 0^+. $T_{1/2}$: from DSAM in (n,n′γ).
3277.19 *19*	4^+	0.31 ps *11*	B DE gHIj R U W	XREF: Others: AC XREF: W(3270)AC(3271) Jπ: L(p,t)=4 for a level at 3271 *5*; L(α,α′)=4 for a level at 3270; ΔJ=2, E2 γ to 2^+. $T_{1/2}$: unweighted average of 0.42 ps *+7−6* (DSAM in (n,n′γ)) and 0.194 ps *28* (DSAM in (α,pγ)).
3369.97 *14*	1^+	0.30 ps *8*	A C H M OP RS	XREF: Others: AE $T_{1/2}$: weighted average of 0.35 ps *+8−6* (DSAM in (n,n′γ)) and 0.19 ps *9* (DSAM in (α,pγ)). Jπ: 3369γ to g.s. dipole from γ(θ) measurement in (n,n′γ); L(d,p)=1 from $3/2^-$ target.
3378 *3*			H	XREF: Others: AE
3462 *3*	$1^+,2^+,3^+,4^+$		H O ST	XREF: Others: AC, AE XREF: AE(3473) Jπ: 2289γ to 2^+; L(d,p)=3, L-(1/2) from $3/2^-$ target for a 3460 *25* level suggests $(1{:}4)^+$, but note that level in (d,p) is not reported by 2023Sp03.
3474.0 *10*	(0^+)		L	E(level): preliminary data from (^{18}O,^{16}Oγ). Jπ: From comparison to shell model calculations and decay patterns in 2019Le24.
3486 *3*			H	
3518.70 *12*	2^+	0.41 ps *21*	A C HI M OP RSTU W	XREF: Others: AA, AC, AE XREF: C(?)T(3510)aa(3530)ac(3518) Jπ: J=2,4 from γγ(θ) in ^{61}Ni(n,γ); 3519, E2 γ to 0^+; L(t,p)=2; L(p,t)=0+2, where L=0 component is most likely for 3524 level; L(d,p)=1 from $3/2^-$ target; L(d,^{3}He)=1+3 from $3/2^-$ target for a 3530 *50* level, which can correspond to 3518.7 and/or 3522.6 level. $T_{1/2}$: unweighted average of 0.62 ps *+12−10* (DSAM in (n,n′γ)) and 0.201 ps *38* (DSAM in (α,pγ)).
3522.65 *14*	$(3)^+$	0.39 ps *22*	H M R	XREF: Others: AA, AE XREF: aa(3530) Jπ: primary γ from $1^-,2^-$ capture state in (n,γ); 1185.9γ, E2+M1 to 4^+; L(d,^{3}He)=1+3 from $3/2^-$ target for a 3530 *50* level for 3518.7 and/or 3522.6 level. $T_{1/2}$: unweighted average of 0.61 ps *+30−17* (DSAM in (n,n′γ)) and 0.17 ps *10* (DSAM in (α,pγ)).
3524.4 *4*	0^+	0.7 ps *+5−2*	FG L R	XREF: Others: AC, AE XREF: F(3519)G(3520)ac(3518) Jπ: L(^{6}Li,d)=0; L(p,t)=0+2; 0^+ assigned in (^{16}O,^{12}C). $T_{1/2}$: from DSAM in (n,n′γ).
3756.7 *3*	3^-	0.158 ps *31*	FgHIJ M O QRSTUVW	XREF: Others: AC B(E3)↑=0.020 *3* (1967Du07,2002Ki06) XREF: J(3730)T(3740)

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$[&]	XREF	Comments
				J$^{\pi}$: L(p,t)=L(t,p)=L(p,p′)=3. $T_{1/2}$: weighted average of 0.17 ps +8−5 (DSAM in (n,n′γ)) and 0.153 ps 31 (DSAM in (α,pγ)). B(E3) from (e,e′) (1967Du07).
3849.57 25	(0,1,2)		M P s	XREF: s(3844) J$^{\pi}$: probable dipole γ from 7646, 1^{-} level in (γ,γ'); primary γ from 1^{-},2^{-}.
3852.0? 10	(0^{+})		L s	XREF: s(3844) E(level),J$^{\pi}$: preliminary data from (^{18}O,^{16}Oγ).
3859.6 4	(2)$^{+}$	0.277 ps +17−9	C HI M OP STU Y	XREF: Others: AC XREF: S(3853)T(3850)AC(3853) J$^{\pi}$: 968.2γ and 3816.2γ to 0^{+} states, L(p,t)=2 for a doublet; L(d,p)=1 from 3/2^{-} target. $T_{1/2}$: from DSAM in (α,pγ).
3910?			O	J$^{\pi}$: L(d,p)=1 from 3/2^{-} target suggests 0^{+},1^{+},2^{+} for a 3910 level reported by 1963Fu04, but the level is not seen in (d,p) data of 1981Ka24 and 2023Sp03.
3967 3			H S	
3973.0 4	2^{+}	0.111 ps 35	HI M OP T	XREF: Others: AC XREF: T(3960)AC(3969) J$^{\pi}$: L(p,t)=2. $T_{1/2}$: from DSAM in (α,pγ).
4000.5 10	4^{+}	0.042 ps +28−21	H ST W	XREF: Others: AA, AC XREF: T(3980)W(4010)AC(3997) J$^{\pi}$: L(p,t)=4. $T_{1/2}$: from DSAM in (α,pγ).
4010.9 15		>0.90 ps	H O	XREF: Others: AA, AC XREF: O(?)ac(4011) J$^{\pi}$: 2837.9γ to 2^{+}; L(d,p)=(3) from 3/2^{-} target for a 4011 level in 1967Al04 suggests (1:4)$^{(+)}$, but level in (d,p) is not seen by 1981Ka24 and 2023Sp03, thus considered uncertain in (d,p) by the evaluators. $T_{1/2}$: from DSAM in (α,pγ).
4016.52[a] 24	6^{+}	0.62 ps 28	DE H S	XREF: Others: AA, AC XREF: ac(4011) J$^{\pi}$: ΔJ=2, E2 γ to 4^{+}; band member. $T_{1/2}$: lower limit from DSA and upper limit from RDM in (^{18}O,4nγ). Other: 0.076 ps +62−28 in (α,pγ).
4041.4 8			O ST	XREF: Others: AA XREF: O(?)T(4040) J$^{\pi}$: 1738γ to 2^{+}; L(d,p)=1 from 3/2^{-} target for a 4042 level reported by 1967Al04 suggests 0^{+},1^{+},2^{+}; but level in (d,p) is not seen by 1981Ka24 and 2023Sp03, thus considered uncertain in (d,p) by the evaluators.
4054.98 25	4^{+}	0.042 ps 14	B H j S y	XREF: Others: AA, AC, AE XREF: AC(4049) J$^{\pi}$: L(p,t)=4. $T_{1/2}$: from DSAM in (α,pγ).
4062.5 5	1^{+},2^{+}		A HI M OP y	XREF: Others: AA, AE XREF: O(4058) J$^{\pi}$: primary γ from 1^{-}, 2^{-} capture state; 4062.4γ to g.s.; L(d,p)=1+3 from 3/2^{-} target.

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)†	J$^{\pi}$‡	T$_{1/2}$&	XREF	Comments
4146.0 *8*	(4$^+$)	0.34 ps *+21−11*	H jK ST y	XREF: Others: AA, AC XREF: K(4200)T(4130)ac(4154) J$^{\pi}$: L(p,t)=(4) for a doublet at 4154 *6*; L(α,^{2}He)=4 from DWBA analysis and proposed configuration=$\nu p_{3/2}\otimes\nu f_{5/2}$ for 4110 *50* level, which can correspond to 4146 and/or 4158 levels. T$_{1/2}$: from DSAM in (α,pγ).
4151.36 *25*	2$^+$,3	0.034 ps *9*	H j M ST	XREF: Others: AA XREF: T(4140) J$^{\pi}$: primary γ from 1$^-$, 2$^-$ capture state in (n,γ); 1815.8γ to 4$^+$. T$_{1/2}$: from DSAM in (α,pγ).
4154.2 *4*	(4$^+$)		HIj	XREF: Others: AA, AC XREF: ac(4154) J$^{\pi}$: L(p,t)=(4) for a doublet at 4154 *6*.
4158.20 *21*	(5)$^-$	<1.4 ps	DE H O W	XREF: O(4165)W(4150) J$^{\pi}$: L(α,α')=5 for a level at 4150. J=(5) from (^{18}O,4nγ); L(d,p)=4 from 3/2$^-$ target; 1821.4 and 881.1 (E1+M2) γs to 4$^+$. T$_{1/2}$: from RDM in (^{18}O,4nγ). A 1001γ was placed from the 4158 level in ^{59}Co(α,pγ) by 1978Oh04, but such a placement was not confirmed in any of the other in-beam γ-ray studies.
4178.7 *4*	(6$^+$)		D H S U	J$^{\pi}$: γ to 4$^+$ and γ from (6)$^-$.
4201.1 *2*	(1$^+$,2,3)		M S	J$^{\pi}$: primary γ from 1$^-$,2$^-$; 678.5γ to (3)$^+$. 2007ChZX in (n,γ) listed only the 4201.0 *3* γ from this level, without Iγ; this placement, if real, would suggest J^{π}=(1,2$^+$) for the 4201 level.
4208.8 *21*	0$^+$,1$^+$,2$^+$		M O	XREF: O(4206) J$^{\pi}$: L(d,p)=1 from 3/2$^-$ target. 2007ChZX in (n,γ) listed a 4208.7 *15* γ from this level without Iγ. If real, then 0$^+$ would be excluded.
4230.0 *10*	0$^+$		M P S U	XREF: Others: AC J$^{\pi}$: L(p,t)=0.
4300.0 *10*			sT	
4317.1 *11*	1,2$^+$		I M s V	XREF: Others: AC J$^{\pi}$: primary γ from 1$^-$, 2$^-$ capture state in (n,γ); 4318γ to 0$^+$.
4393 *7*			S	
4407.0 *10*	2$^+$		ST	XREF: Others: AC XREF: T(4400)AC(4409) J$^{\pi}$: L(p,t)=2.
4415.9 *4*	1,2$^+$		I M	J$^{\pi}$: primary γ from 1$^-$, 2$^-$ capture state in (n,γ); 4416γ to 0$^+$.
4424 *3*	0$^+$,1$^+$,2$^+$		H O	J$^{\pi}$: L(d,p)=1 from 3/2$^-$ target.
4436.9 *10*	(3$^-$)		ST W	XREF: Others: AC XREF: W(4430) J$^{\pi}$: L(α,α')=(3).
4455 *4*			I S	XREF: Others: AC
4502.9 *10*	(3)$^-$		I O ST	XREF: Others: AC XREF: O(4516)

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[&]	XREF	Comments
				J^{π}: L(p,t)=(3); L(d,p)=4 from $3/2^-$ target for 4516 *7* level.
4610.6 *10*	$(1,2^+)$		sT	XREF: s(4618) J^{π}: γ to 0^+.
4623 *5*	0^+		I s	XREF: Others: AC XREF: s(4618) J^{π}: L(p,t)=L(t,p)=0.
4627.5 *10*	2^+,3		M	J^{π}: primary γ from 1^-, 2^- capture state in (n,γ); 2289.7γ to 4^+.
4643 *3*	$0^+,1^+,2^+$		O	J^{π}: L(d,p)=1 from $3/2^-$ target.
4644.21[b] *23*	7^-	509 ps *24*	DE H JK	XREF: J(4630) J^{π}: ΔJ=1 (E1+M2) γ to 6^+; ΔJ=2 E2 γ to 5^-; L(α,^{2}He)=7 from DWBA analysis and proposed configuration=$\nu f_{5/2}\otimes\nu g_{9/2}$. $T_{1/2}$: from RDM in (^{18}O,4nγ).
4655.0 *10*	3^-		I ST W	XREF: Others: AC XREF: T(4640)W(4650) J^{π}: L(p,t)=L(α,α')=3.
4707.0 *10*			ST	XREF: Others: AE
4712 *5*	2^+		I S	XREF: Others: AA, AC, AE J^{π}: L(p,t)=2.
4719.9 *7*	$(3)^-$		M O	XREF: Others: AA, AE XREF: O(4721) J^{π}: L(d,p)=4 from $3/2^-$ target; 3546γ to 2^+.
4773.3 *7*	$(2^+,3,4^+)$		sT y	XREF: Others: AA J^{π}: γs to 2^+ and 4^+.
4781 *5*	2^+		I sT W y	XREF: Others: AA, AC XREF: W(4790) J^{π}: L(p,t)=2.
4835 *7*			S y	XREF: Others: AA
4847 *7*	(1 to 5)$^{(+)}$		ST	XREF: Others: AA J^{π}: L(d,^{3}He)=3 from $3/2^-$ target for a 4850 *80* level.
4861 *5*	(2^+)			XREF: Others: AA, AC, AE J^{π}: L(p,t)=(2).
4861.3 *4*	$(6)^-$	8.39 ps *14*	DE o ST	XREF: Others: AE XREF: T(4870) J^{π}: L(d,p)=1+4 from $3/2^-$ target for a doublet; ΔJ=1, (M1+E2) 703.4γ to (5^-); 682.4γ to (6^+). $T_{1/2}$: from RDM in (^{18}O,4nγ).
4870 *10*	$0^+,1^+,2^+$		I o	XREF: Others: AE J^{π}: L(d,p)=1+4 from $3/2^-$ target for a doublet; the L=4 component likely is associated with the 4861 level.
4882 *5*	4^+		S	XREF: Others: AA, AC, AE J^{π}: L(p,t)=4.
4949 *7*	$3^-,4^-,5^-,6^-$		O S	XREF: O(4952) J^{π}: L(d,p)=4 from $3/2^-$ target.
4967 *7*			S	
4981 *7*	4^+		IJ S w	J^{π}: L(α,^{2}He)=4 from DWBA analysis and proposed configuration=$\nu p_{3/2}\otimes\nu f_{5/2}$.
4994 *6*	3^-		O w	XREF: Others: AC XREF: O(5004)

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)†	Jπ‡	XREF	Comments
			Jπ: L(p,t)=3; L(d,p)=4 from 3/2⁻ target for 5004 *10* level. E(level): doublet in (p,t).
4999.7 *8*	1,2⁺	I M ST w	Jπ: primary γ from 1⁻, 2⁻ capture state in (n,γ); 4998γ to 0⁺.
5016 *5*	4⁺	I S w	XREF: Others: AC Jπ: L(p,t)=4.
5041 *10*		o S	XREF: o(5062) Jπ: see Jπ comment for 5071 level.
5071 *10*		o ST	XREF: o(5062) Jπ: L(d,p)=1+4 from 3/2⁻ target for a doublet gives 0⁺,1⁺,2⁺ for one level, and 3⁻,4⁻,5⁻,6⁻ for the other.
5121 *10*		ST	
5148 *5*	(2⁺)	S	XREF: Others: AC Jπ: L(p,t)=(2).
5154 *10*	(2⁺,4⁺)	I S	Jπ: L(t,p)=(2+4).
5203 *5*	2⁺	S	XREF: Others: AC Jπ: L(p,t)=2.
5222 *10*		ST	
5233 *10*	0⁺,1⁺,2⁺	O S	XREF: O(5240) Jπ: L(d,p)=1 from 3/2⁻ target for a 5240 *10* level.
5279.9 *10*		k ST	
5286 *6*	2⁺	I k S W	XREF: Others: AC XREF: W(5310) Jπ: L(p,t)=(2), L(α,α′)=2. E(level): doublet in (p,t).
5331 *10*	(3⁻)	I k O ST	Jπ: L(t,p)=(3); L(d,p)=1,2 from 3/2⁻ target for 5325 *10* level.
5355 *5*	4⁺	k S	XREF: Others: AC Jπ: L(p,t)=4.
5393 *10*		S	
5420 *5*	(4⁺)	I ST	XREF: Others: AC Jπ: L(p,t)=(4).
5447 *5*	0⁺	I S	XREF: Others: AC Jπ: L(p,t)=0.
5465 *6*		S	XREF: Others: AC
5481 *10*	(1)⁻#	O S	Jπ: L(d,p)=2 from 3/2⁻ target for a 5472 *12* level.
5511 *10*		S	
5.53×10³ *10*	6⁺	Q	Jπ: from form factor in ^{62}Ni(e,e′).
5541 *5*	2⁺	I S	XREF: Others: AA, AC XREF: AA(5540) Jπ: L(p,t)=2. L(d,^{3}He)=3 from 3/2⁻ target for a 5540 *80* level.
5545 *10*		S	
5565 *10*		S	
5574 *5*	2⁺	I S	XREF: Others: AC Jπ: L(p,t)=2.
5587 *10*	0⁻,1⁻,2⁻,3⁻,4⁻	O S	XREF: O(5581) Jπ: L(d,p)=2 from 3/2⁻ target for 5581 *12* level.
5601 *10*		S	
5628 *6*	3⁻	I S W	XREF: Others: AC XREF: W(5640) Jπ: L(t,p)=3; L(α,α′)=3 for a level at 5640 *10*.
5632 *12*	(1)⁺#	O	Jπ: L(d,p)=1 from 3/2⁻ target.
5673 *10*	(5⁻)	JK S	XREF: J(5660) Jπ: L(α,^{2}He)=(5) from DWBA analysis and proposed configuration=$\nu f_{5/2} \otimes \nu d_{5/2}$.
5679 *8*		I S	XREF: Others: AC E(level): doublet in (p,t).

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[&]	XREF	Comments
5688.6 *4*	(8$^-$)		D	J$^\pi$: ΔJ=(2), (Q) γ to (6$^-$).
5709 *10*			S	
5739 *10*			S	
5746.64[b] *24*	(8$^-$)	0.55 ps *21*	DE	J$^\pi$: ΔJ=(1), (M1+E2) γ to 7$^-$; γ to 6$^-$. $T_{1/2}$: lower limit from DSA and upper limit from RDM in (^{18}O,4nγ).
5772 *10*			S	
5808 *6*	(3$^-$)		E S	XREF: Others: AC J$^\pi$: L(p,t)=(3).
5834 *10*			S	
5846 *10*			O S	XREF: O(5843) J$^\pi$: L(d,p)=1,2 form 3/2$^-$ target for 5843 *16* level suggests 0$^+$,1$^+$,2$^+$ or 0$^-$,1$^-$,2$^-$,3$^-$,4$^-$.
5859 *10*			S	
5870 *10*			S	
5885 *8*	(4$^+$)		S	XREF: Others: AC E(level),J$^\pi$: L(p,t)=(4) for a doublet.
5901 *10*	2$^+$		S W	XREF: W(5930) J$^\pi$: L(α,α′)=2.
5912 *8*	4$^+$		S	XREF: Others: AC J$^\pi$: L(p,t)=4.
5961 *10*			S	
5979 *10*			S	
5994 *7*	(1,2)$^-$		O S	XREF: Others: AA J$^\pi$: L(d,^{3}He)=0 from 3/2$^-$ target for an unresolved peak at 5990 *80*; L(d,p)=2 from 3/2$^-$ target.
6023 *10*			S	
6026 *10*			S	
6047 *8*	(3$^-$)		S	XREF: Others: AC J$^\pi$: L(p,t)=(3).
6059 *10*			JK S	E(level): doublet in (α,^{2}He).
6073 *8*			S	XREF: Others: AC E(level): doublet in (p,t).
6098 *7*	(1)$^-$[#]		O S	J$^\pi$: L(d,p)=2 from 3/2$^-$ target.
6126 *8*			S	XREF: Others: AC E(level): assumed to be same as 6121 *10* level seen in (p,p′).
6133 *10*			S	
6143 *10*			S	
6160 *9*				XREF: Others: AC E(level): doublet in (p,t).
6179 *4*	(1)$^-$[#]		O S	XREF: S(6170) J$^\pi$: L(d,p)=2 from 3/2$^-$ target.
6253 *9*	(4$^+$)			XREF: Others: AC E(level),J$^\pi$: L(p,t)=(4) for a doublet.
6280 *2*	(1)$^-$[#]		O	J$^\pi$: L(d,p)=2 from 3/2$^-$ target.
6313 *9*				XREF: Others: AC
6320.2 *7*	(1,2)		T	J$^\pi$: γ to 0$^+$.
6354 *8*	2$^+$			XREF: Others: AC J$^\pi$: L(p,t)=2.
6360 *5*	1$^-$,2$^-$,3$^-$,4$^-$		O	J$^\pi$: L(d,p)=2 from 3/2$^-$ target; and L+(1/2), j=5/2$^+$ transfer.
6398 *8*	4$^+$			XREF: Others: AC J$^\pi$: L(p,t)=4.
6417 *12*	0$^-$,1$^-$,2$^-$,3$^-$,4$^-$		O	J$^\pi$: L(d,p)=2 from 3/2$^-$ target.

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)†	J$^{\pi}$‡	$T_{1/2}$&	XREF	Comments
6454 *8*				XREF: Others: AC
6482 *10*	$0^-,1^-,2^-,3^-,4^-$		O	J$^{\pi}$: L(d,p)=2 from $3/2^-$ target.
6520	3^-		S W	XREF: W(6530) J$^{\pi}$: L(p,p′)=L(α,α')=3.
6549 *8*	$(1,2)^-$		O	XREF: Others: AA XREF: AA(6540) J$^{\pi}$: L(d,p)=2 from $3/2^-$ target; L(d,^{3}He)=0 from $3/2^-$ target for an unresolved peak at 6540 *80*.
6606 *5*	$(1)^{+}$#		O	J$^{\pi}$: L(d,p)=1 from $3/2^-$ target.
6642.6[b] *3*	(9^-)		DE	J$^{\pi}$: ΔJ=2, Q γ to 7^-; ΔJ=1, D+Q γ to (8^-).
6680			J S	XREF: J(6620)
6715 *9*	$(1)^{-}$#		O	XREF: Others: AA XREF: AA(6750) J$^{\pi}$: L(d,p)=2 from $3/2^-$ target; L(d,^{3}He)=0 from $3/2^-$ target for an unresolved peak at 6750 *80*.
6942 *7*	$(1)^{-}$#		O	J$^{\pi}$: L(d,p)=2 from $3/2^-$ target.
7030	3^-		S	J$^{\pi}$: L(p,p′)=3.
7042 *8*	$(1)^{-}$#		O	J$^{\pi}$: L(d,p)=2 from $3/2^-$ target.
7132 *5*	$(1)^{-}$#		O	J$^{\pi}$: L(d,p)=2 from $3/2^-$ target.
7138.2[c] *5*	(8^+)		D	J$^{\pi}$: ΔJ=1, dipole γ to 7^-. Comparison with cranked Nilsson-Strutinsky calculations suggests tentative $8^{(+)}$ (2016Al18).
7170.3 *7*	(1,2)		T	J$^{\pi}$: γ to 0^+.
7190 *50*	(8^+)		JK	E(level): doublet in (α,^{2}He). J$^{\pi}$: L(α,^{2}He)=(8) from DWBA analysis and proposed configuration=$\nu g^2_{9/2}$.
7211 *8*	$0^-,1^-,2^-,3^-,4^-$		O	J$^{\pi}$: L(d,p)=2 from $3/2^-$ target.
7218.6 *6*	(10^-)		D	J$^{\pi}$: ΔJ=(2), (Q) γ to (8^-).
7263 *11*	$(1)^{-}$#		O S	XREF: S(7260) J$^{\pi}$: L(d,p)=2 from $3/2^-$ target.
7313 *10*	$1^-,2^-,3^-,4^-$		O	J$^{\pi}$: L(d,p)=2 from $3/2^-$ target; and L+(1/2), j=$5/2^+$ transfer.
7346.8 *5*	(10^-)		D	J$^{\pi}$: γ to (8^-).
7398 *5*	$0^-,1^-,2^-,3^-,4^-$		O	J$^{\pi}$: L(d,p)=2 from $3/2^-$ target.
7459 *10*	$(1)^{+}$#		O	J$^{\pi}$: L(d,p)=1 from $3/2^-$ target.
7541 *11*	$(1)^{-}$#		O	J$^{\pi}$: L(d,p)=2 from $3/2^-$ target.
7555.3[b] *4*	(10^-)	0.83 ps *42*	DE	J$^{\pi}$: ΔJ=(2), (E2) γ to (8^-); ΔJ=1, (M1+E2) γ to (9^-). $T_{1/2}$: lower limit from DSA and upper limit from RDM in (^{18}O,4nγ).
7600	(6^+)		JK	J$^{\pi}$: L(α,^{2}He)=(6) from DWBA analysis and proposed configuration=$\nu g_{9/2}\otimes\nu d_{5/2}$.
7600.5 *10*	(1,2)		ST	XREF: S(7620) J$^{\pi}$: γ to 0^+.
7645.7 *3*	1^-		OP	XREF: O(7644) E(level): differs from Eγ of capture γ from Fe(n,γ) by 14.35 eV *15*. J$^{\pi}$: E1 γ to g.s., ^{62}Ni(γ,γ'); also L(d,p)=2 from $3/2^-$ target.
7700.5 *10*	$(1,2)^-$		O T	XREF: O(7703) J$^{\pi}$: γ to 0^+; L(d,p)=2 from $3/2^-$ target.
7774 *12*	$(1)^{-}$#		O	J$^{\pi}$: L(d,p)=2 from $3/2^-$ target.

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[&]	XREF	Comments
7835 *11*	(1)⁻[#]		O	Jπ: L(d,p)=2 from 3/2⁻ target.
7886 *11*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
7982 *10*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
8072 *5*	(1)⁻[#]		O	Jπ: L(d,p)=2 from 3/2⁻ target.
8118 *4*	(1)⁻[#]		O	Jπ: L(d,p)=2 from 3/2⁻ target.
8200.6 *10*	(1,2)		T	Jπ: γ to 0⁺.
8217 *5*	(1)⁻[#]		O	Jπ: L(d,p)=2 from 3/2⁻ target.
8295.5[c] *6*	(10⁺)	<1.4 ps	DE	Jπ: ΔJ=2, E2 γ to (8⁺). $T_{1/2}$: from RDM in ^{48}Ca(^{18}O,4nγ), where 1157γ was associated with a 5805 level.
8340 *8*	(1)⁻[#]		O	Jπ: L(d,p)=2 from 3/2⁻ target.
8375.3[b] *4*	(11⁻)		D	Jπ: ΔJ=(1), (D+Q) γ to (10⁻); γ to (9⁻).
8396 *5*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
8487 *9*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
8650 *4*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
8709.5[d] *4*	(10⁻)		D	Jπ: ΔJ=0, D+Q γ to (10⁻).
8773 *8*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
8872 *9*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
8927 *7*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
8989.2[b] *4*	(12⁻)		D	Jπ: ΔJ=2, Q γ to (10⁻); ΔJ=1, D+Q γ to (11⁻).
9070 *5*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
9139 *10*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
9186 *10*			O	
9267 *10*			O	
9309 *16*			O	
9459 *12*			O	
9526 *9*			O	
9590 *15*			O	
9694 *15*			O	
9698.7[c] *7*	(12⁺)		D	Jπ: ΔJ=2, Q γ to (10⁺).
9874 *17*			O	
9924.4[d] *4*	(12⁻)		D	Jπ: ΔJ=2, Q γ to (10⁻); γ to (12⁻).
10133 *12*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
10242 *15*			O	
10321 *15*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
10491 *17*	0⁻,1⁻,2⁻,3⁻,4⁻		O	Jπ: L(d,p)=2 from 3/2⁻ target.
(10596.1 *3*)	1⁻,2⁻		M	
10597.0[@] *3*	(1⁻)[@]		N	
10598.8[@] *3*	[1]⁺[@]		N	
10599.0[@] *3*	2⁻[@]		N	
10602.0[@] *3*	[1]⁺[@]		N	
10602.1[@] *3*	[1]⁺[@]		N	
10602.7[@] *3*	1⁻[@]		N	
10603.1[@] *3*	2⁻[@]		N	
10604.3[@] *3*	2⁻[@]		N	
10605.5[@] *3*	(0 to 3)⁺[@]		N	
10605.7[@] *3*	[1]⁺[@]		N	
10606.4 *3*			N	
10606.9 *3*			N	
10607.3 *3*			N	

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
10608.1[@] 3	2−[@]	N	
10608.8[@] 3	[1]+[@]	N	
10609.1[@] 3	2−[@]	N	
10609.5[@] 3	2+[@]	N	
10609.8[@] 3	[1]+[@]	N	
10610.9[@] 3	(0 to 3)+[@]	N	
10611.2[@] 3	(0 to 3)+[@]	N	
10612.0[@] 3	1−[@]	N	
10612.2[@] 3	(0 to 3)+[@]	N	
10613.2[@] 3	1−[@]	N	
10614.2[@] 3	2−[@]	N	
10615.7[@] 3	(0 to 3)+[@]	N	
10616.0[@] 3	(0 to 3)+[@]	N	
10616.7[@] 3	(0 to 3)+[@]	N	
10616.9[@] 3	[1]+[@]	N	
10619 19	0−,1−,2−,3−,4−	O	Jπ: L(d,p)=2 from 3/2− target.
10619.9[@] 3	1−[@]	N	
10620.6[@] 3	(0 to 3)+[@]	N	
10621.4[@] 3	(0 to 3)+[@]	N	
10621.8[@] 3	(0 to 3)+[@]	N	
10622.5[@] 3	(0 to 3)+[@]	N	
10623.0[@] 3	(0 to 3)+[@]	N	
10623.3[@] 3	(0 to 3)+[@]	N	
10623.4[@] 3	2−[@]	N	
10624.2[@] 3	1−[@]	N	
10624.3[@] 3	2−[@]	N	
10625.3[@] 3	(0 to 3)+[@]	N	
10625.8[@] 3	2−[@]	N	
10626.2[@] 3	1−[@]	N	
10626.9[@] 3	2−[@]	N	
10627.8[@] 3	2−[@]	N	
10628.8[@] 3	1−[@]	N	
10629.7[@] 3	[1]+[@]	N	
10631.1[@] 3	(0 to 3)+[@]	N	
10632.1[@] 3	1−[@]	N	
10632.2[@] 3	2−[@]	N	
10632.4[@] 3	[1]+[@]	N	
10636.3[@] 3	1−[@]	N	
10638.2 3		N	
10638.5[@] 3	2−[@]	N	
10640.3[@] 3	1−[@]	N	
10640.4[@] 3	(2)+[@]	N	
10641.0[@] 3	1−[@]	N	

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)†	Jπ‡	XREF
10641.5@ *3*	$[1]^{-}$@	N
10645.3@ *3*	2^{-}@	N
10645.5@ *3*	2^{-}@	N
10646.2@ *3*	$[1]^{+}$@	N
10646.3@ *3*	$[1]^{+}$@	N
10647.3@ *3*	$[1]^{+}$@	N
10648.0@ *3*	2^{-}@	N
10649.5@ *3*	1^{-}@	N
10651.2@ *3*	2^{-}@	N
10652.7@ *3*	2^{-}@	N
10652.9@ *3*	2^{-}@	N
10654.0@ *3*	$[1]^{+}$@	N
10655.4@ *3*	2^{-}@	N
10655.5@ *3*	2^{-}@	N
10657.9@ *3*	$[1]^{+}$@	N
10658.3@ *3*	$[1]^{+}$@	N
10658.6@ *3*	2^{-}@	N
10660.3@ *3*	2^{-}@	N
10662.9@ *3*	2^{-}@	N
10664.1@ *3*	2^{-}@	N
10664.2@ *3*	1^{-}@	N
10665.3@ *3*	$[1]^{+}$@	N
10667.4@ *3*	2^{-}@	N
10671.7@ *3*	2^{-}@	N
10671.8@ *3*	1^{-}@	N
10673.3@ *3*	$[1]^{+}$@	N
10673.5@ *3*	2^{-}@	N
10674.8@ *3*	2^{-}@	N
10677.2@ *3*	1^{-}@	N
10677.5@ *3*	1^{-}@	N
10678.4@ *3*	2^{-}@	N
10681.0@ *3*	$[1]^{+}$@	N
10682.7@ *3*	1^{-}@	N
10688.2@ *3*	2^{-}@	N
10690.6@ *3*	1^{-}@	N
10690.8@ *3*	2^{+}@	N
10691.1@ *3*	$[1]^{+}$@	N
10692.1@ *3*	1^{-}@	N
10692.4@ *3*	2^{-}@	N
10695.6@ *3*	2^{-}@	N
10698.6@ *3*	1^{-}@	N
10699.1@ *3*	2^{-}@	N
10699.9@ *3*	1^{-}@	N
10702.1@ *3*	2^{-}@	N
10703.2@ *3*	$[1]^{+}$@	N
10703.4@ *3*	2^{-}@	N
10703.9@ *3*	$[1]^{+}$@	N
10704.6@ *3*	$[1]^{+}$@	N
10706.1@ *3*	2^{-}@	N
10708.3@ *3*	2^{-}@	N
10711.1@ *3*	2^{-}@	N
10712.0@ *3*	1^{-}@	N
10712.7@ *3*	2^{-}@	N
10714.2@ *3*	2^{-}@	N
10714.9@ *3*	2^{-}@	N
10716.5@ *3*	2^{-}@	N
10719.1@ *3*	2^{-}@	N
10720.6@ *3*	2^{-}@	N
10721.0@ *3*	1^{-}@	N
10721.7@ *3*	2^{-}@	N
10723.7@ *3*	1^{-}@	N
10724.4@ *3*	1^{-}@	N
10724.7@ *3*	2^{-}@	N
10729.6@ *3*	2^{-}@	N
10730.7@ *3*	2^{-}@	N
10731.6@ *3*	2^{-}@	N
10734.2@ *3*	2^{-}@	N
10735.3@ *3*	1^{-}@	N
10736.0@ *3*	2^{-}@	N
10736.7@ *3*	2^{-}@	N
10738.5@ *3*	2^{-}@	N
10740.6@ *3*	1^{-}@	N
10741.1@ *3*	2^{-}@	N
10742.6@ *3*	2^{-}@	N
10746.2@ *3*	2^{-}@	N
10747.0@ *3*	1^{-}@	N
10747.9@ *3*	2^{-}@	N
10748.4@ *3*	2^{-}@	N
10749.6@ *3*	1^{-}@	N
10752.2@ *3*	1^{-}@	N
10753.0@ *3*	2^{-}@	N
10754.8@ *3*	2^{-}@	N
10757.7@ *3*	1^{-}@	N
10759.6@ *3*	1^{-}@	N

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	XREF
10760.5[@] *3*	2−[@]	N
10763.7[@] *3*	2−[@]	N
10766.0[@] *3*	2−[@]	N
10766.9[@] *3*	1−[@]	N
10769.7[@] *3*	1−[@]	N
10772.3[@] *3*	2−[@]	N
10774.6[@] *3*	2−[@]	N
10776.4[@] *3*	2−[@]	N
10778.2[@] *3*	1−[@]	N
10781.5[@] *3*	2−[@]	N
10786.4[@] *3*	1−[@]	N
10787.7[@] *3*	2−[@]	N
10790.9[@] *3*	2−[@]	N
10793.2[@] *3*	1−[@]	N
10795.9[@] *3*	2−[@]	N
10798.4[@] *3*	[1]+[@]	N
10799.0[@] *3*	1−[@]	N
10800.5[@] *3*	[1]+[@]	N
10802.1[@] *3*	3+[@]	N
10802.9[@] *3*	2−[@]	N
10804.5[@] *3*	3+[@]	N
10805.8[@] *3*	[1]+[@]	N
10807.0[@] *3*	2−[@]	N
10810.2[@] *3*	2−[@]	N
10812.4[@] *3*	2−[@]	N
10817.0[@] *3*	2−[@]	N
10819.1[@] *3*	2−[@]	N
10822.6[@] *3*	2−[@]	N
10824.3[@] *4*	2−[@]	N
10824.4[@] *5*	1−[@]	N
10827.7[@] *3*	2−[@]	N
10828.4[@] *3*	1−[@]	N
10832.1[@] *3*	2−[@]	N
10832.2[@] *5*	1−[@]	N
10845.6[@] *3*	2−[@]	N
10849.8[@] *3*	1−[@]	N
10851.3[@] *3*	2−[@]	N
10855.2[@] *3*	2−[@]	N
10858.6[@] *3*	2−[@]	N
10868.6[@] *3*	2−[@]	N
10876.0[@] *3*	2−[@]	N
10878.8[@] *3*	2−[@]	N

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
10882.4[@] *3*	2⁻[@]	N	
10884.3[@] *3*	2⁻[@]	N	
10885.6[@] *3*	2⁻[@]	N	
10888.1[@] *3*	2⁻[@]	N	
10891.1[@] *3*	2⁻[@]	N	
11335.2[c] *7*	(14⁺)	D	Jπ: ΔJ=(2), (Q) γ to (12⁺).
11478.0[d] *5*	(14⁻)	D	Jπ: ΔJ=2, Q γ to (12⁻).
13288.4[c] *8*	(16⁺)	D	Jπ: ΔJ=2, Q γ to (14⁺).
13441.8[d] *5*	(16⁻)	D	Jπ: ΔJ=2, Q γ to (14⁻).
15554.5[c] *9*	(18⁺)	D	Jπ: ΔJ=2, Q γ to (16⁺).
15875.0[d] *8*	(18⁻)	D	Jπ: ΔJ=2, Q γ to (16⁻).
18187.9[c] *10*	(20⁺)	D	Jπ: ΔJ=(2),(Q) γ to (18⁺).
18669.7[d] *10*	(20⁻)	D	Jπ: ΔJ=(2),(Q) γ to (18⁻).
21315.5[c] *11*	(22⁺)	D	Jπ: ΔJ=(2),(Q) γ to (20⁺).
21851.8[d] *22*	(22⁻)	D	Jπ: ΔJ=(2),(Q) γ to (20⁻).
25453[d] *5*	(24⁻)	D	Jπ: in-band γ to (22⁻).

† From a least-squares fit for levels connected by γ rays; and from ^{64}Ni(p,t), ^{62}Ni(p,p′), and ^{61}Ni(d,p) for levels not populated in γ-ray studies. Exceptions are noted.

‡ For high-spin levels (J>6 or so), assignments are generally based on ΔJ and multipolarities for γ transitions deduced from γ(θ) data in ^{26}Mg(^{48}Ca,2α4nγ) (2016Al18), combined with band associations. Further, ascending spins with increasing excitation energy are assumed due to the yrast nature of population of levels in heavy-ion in-beam γ-ray spectroscopy. Exceptions are noted.

J=1 or (1) assigned by 2023Sp03 from ^{62}Ni(γ,γ′) in a paper to be published (ref. 53 in 2023Sp03); partial data from (γ,γ′) are presented in Fig. 8d of 2023Sp03. As details of (γ,γ′) data are not available, evaluators consider J=1 assignments as tentative, thus placed in parentheses.

@ Neutron resonance, J^π from R-matrix analysis (2006Ko28).

& For excited states, half-lives have been measured in ^{48}Ca(^{18}O,4nγ) (1978Wa09) using recoil-distance method (RDM) and DSAM for 2336, 4018, 4160, 4648, 4862, 5750, 5805 and 7518 levels; and in ^{59}Co(α,pγ) (1978Ke11,1978Oh04) using DSAM and line-shape analysis for 1173, 2048, 2302, 2336, 2890, 3059, 3158, 3176, 3258, 3277, 3371, 3520, 3522, 3757, 3862, 3977, 4000, 4010, 4018, 4055, 4146 and 4151 levels; and in ^{62}Ni(n,n′γ) (2011Ch05) using DSAM for 1173, 2048, 2302, 2336, 3158, 3176, 3258, 3277, 3371, 3518, 3522 and 3757 levels. In addition, half-life of the 1173 level has been deduced from width measurement in (γ,γ′) (1981Ca10); and from DSAM (2001Ke08,1965Es01) and B(E2) measurements (2014Al20,1971ChZT,1970Le17,1969Ha31,1962St02,1960An07) in Coulomb excitation.

a Band(A): Ground-state band.

b Seq.(D): γ-cascade based on 7⁻.

c Band(B): Rotational band based on (8⁺). Q(transition)=2.2 eb *+11−8* deduced from best fit to fractional Doppler shifts (Fτ) in DSAM measurements for the 1157.3-, 1403.2-, 1636.5-, 1953.20 and 2266.0-keV γ rays; deduced β_2=0.40 *+17−13* (2016Al18) assuming prolate deformation. Configurations involve $f_{7/2}$ proton holes and $g_{9/2}$ neutrons.

d Band(C): Rotational band based on (10⁻). Q(transition)=1.9 eb *+12−7* deduced from best fit to fractional Doppler shifts (Fτ) in DSAM measurements for the 1215.0-, 1553.6-, 1963.8-, 2433.1- and 2794.7-keV γ rays; deduced β_2=0.35 *+19−12* (2016Al18) assuming prolate deformation. Configurations involve $f_{7/2}$ proton holes and $g_{9/2}$ neutrons.

$\gamma(^{62}Ni)$

Additional information 2.

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[&]	δ[&]	α[a]	$I_{(\gamma+ce)}$	Comments
1172.91	2^+	1172.89 *3*	100	0.0	0^+	E2		1.72×10^{-4} *2*		B(E2)(W.u.)=12.13 *18* E_γ: weighted average of 1172.9 *2* from ^{62}Co β^- decay (1.54 min) and ^{62}Co β^- decay (13.86 min), 1172.97 *10* from ^{62}Cu ε decay (9.672 min), 1172.72 *18* from $^{48}Ca(^{18}O,4n\gamma)$, 1173.2 *3* from $^{59}Co(\alpha,p\gamma)$, 1172.80 *10* and 1172.88 *3* from $^{61}Ni(n,\gamma)$, 1172.95 *11* from $^{62}Ni(n,n'\gamma)$, and 1172.91 *9* from (γ,γ'). Other: 1172.1 *1* from $^{26}Mg(^{48}Ca,2\alpha4n\gamma)$ seems discrepant. Mult.: $\Delta J=2$, quadrupole in $^{48}Ca(^{18}O,4n\gamma)$ and $^{62}Ni(n,n'\gamma)$; and RUL.
2048.55	0^+	875.63 *7*	100	1172.91	2^+	E2		3.35×10^{-4} *5*		B(E2)(W.u.)=54 *+31−15* E_γ: weighted average of 875.66 *11* from ^{62}Cu ε decay (9.672 min), 875.6 *4* from $^{59}Co(\alpha,p\gamma)$, 875.64 *8* and 875.37 *12* from $^{61}Ni(n,\gamma)$, 875.69 *7* from $^{62}Ni(n,n'\gamma)$. Mult.: $\Delta J=2$, quadrupole in $^{61}Ni(n,\gamma)$; and RUL.
		2048.4		0.0	0^+	E0			0.015 *3*	E_γ: a 2048.4-keV E0 transition observed in $(p,p'\gamma)$ (1981Pa10) with B(E0 to g.s.)/B(E2 to 1173)=0.028 *5* from measured Ice(K)(2048γ)/Ice(K)(876γ)=0.084 *11* (1981Pa10). $I_{(\gamma+ce)}$: from q^2_K(E0/E2), α(K)(875.63γ), Iγ(875.63γ) and Ω_K/Ω_T=0.1956 (2008Ki07). ρ^2(E0)=0.130 *+60−70* (2019Ev01), q^2_K(E0/E2)=0.084 *11* (2019Ev01). Other: ρ^2(E0)=0.078 *43*; X(E0/E2)=0.028 *5* (1981Pa10). Evaluated q^2_K(E0/E2)=0.097 *17*, X(E0/E2)=0.035 *6*, ρ^2(E0)=0.070 *28* (2022Ki03) for $T_{1/2}$=0.76 ps *+76−28* for the 2048.7 level.
2301.85	2^+	1128.88 *10*	76.8 *22*	1172.91	2^+	M1+E2+E0	+3.1 *1*	2.44×10^{-4} *14*		B(M1)(W.u.)=9.8×10^{-4} *+29−18*; B(E2)(W.u.)=13.0 *+36−24* E_γ: weighted average of 1128.9 *2* from ^{62}Co β^- decay (1.54 min), 1129.0 *3* from ^{62}Co β^- decay (13.86 min), 1128.98 *10* from ^{62}Cu ε decay (9.672 min), 1129.3 *3* from $^{59}Co(\alpha,p\gamma)$, 1128.73 *10* from $^{61}Ni(n,\gamma)$, 1128.82

From ENSDF

$^{62}_{28}Ni_{34}$-16

Adopted Levels, Gammas (continued)

γ(^{62}Ni) (continued)

E_i(level)	J^{π}_i	E_γ [†]	I_γ [†]	E_f	J^{π}_f	Mult. [&]	α [a]	Comments
								14 from ^{62}Ni(n,n′γ). I_γ: weighted average of 70.5 *34* from ^{62}Co β^- decay (1.54 min), 72 *11* from ^{62}Co β^- decay (13.86 min), 75 *4* from ^{62}Cu ε decay (9.672 min), 72 *7* from ^{59}Co(α,pγ), 65 *8* from ^{61}Ni(n,γ) and 80.8 *20* from ^{62}Ni(n,n′γ). α: from measured α(K)exp=1.95E−4 *11* (2019Ev01) in (p,p′γ). In 2022Ki03, %E2=76, %M1=7, %E0=17. q^2_K(E0/E2)=0.22 *7* (2019Ev01). Evaluated q^2_K(E0/E2)=0.23 *8*, X(E0/E2)=0.36 *12*, ρ^2(E0)=0.13 *5* (2022Ki03) for $T_{1/2}$=0.67 ps *+20−14* for 2301.8 level. Mult.: $\gamma(\theta)$ in ^{62}Ni(n,n′γ) and RUL. δ: from $\gamma(\theta)$ in ^{62}Ni(p,p′γ) (2019Ev01). Others: δ=−0.07 *1* from $\gamma(\theta)$ in ^{62}Ni(p,p′γ) (2019Ev01); +1.7 *+9−5* or +0.07 *18* in ^{62}Ni(p,p′γ) (1969Be48); +3.19 *11* in ^{62}Ni(p,p′γ) (1972Va01), +2.70 *+38−28* from $\gamma(\theta)$ data in ^{62}Ni(n,n′γ) (2011Ch05), +0.07 *3* or +1.90 *2* in ^{62}Ni(n,n′γ) (1989Ko54), +3.0 *+7−20* (1976Ca31, $\gamma\gamma(\theta)$ in ^{62}Cu ε decay (9.672 min)). Weighted average of consistent values: +3.1 *1* (2019Ev01), +3.19 *11* (1972Va01), +2.70 *+38−28* (2011Ch05) and +3.0 *+7−20* (1976Ca31) is +3.12 *10*. Lower value of −0.07 *1* in (p,p′γ) (2019Ev01) is not supported in (n,n′γ) (2011Ch05).
2301.85	2$^+$	2301.78 *11*	100.0 *33*	0.0	0$^+$	E2	5.04×10^{-4} *7*	B(E2)(W.u.)=0.53 *+15−10* E_γ: weighted average of 2301.8 *4* from ^{62}Co β^- decay (1.54 min), 2301.9 *5* from ^{62}Co β^- decay (13.86 min), 2301.95 *8* from ^{62}Cu ε decay (9.672 min), 2301.3 *4* from ^{59}Co(α,pγ), 2301.41 *12* from ^{61}Ni(n,γ), 2301.83 *30* from ^{62}Ni(n,n′γ). I_γ: weighted average of 100.0 *34* from ^{62}Co β^- decay (1.54 min), 100 *11* from ^{62}Co β^- decay (13.86 min), 100 *5* from ^{62}Cu ε decay (9.672 min), 100 *7* from ^{59}Co(α,pγ), 100 *14* from ^{61}Ni(n,γ) and 100.0 *33* from ^{62}Ni(n,n′γ). Mult.: $\gamma(\theta)$ in ^{62}Ni(n,n′γ) and RUL.
2336.46	4$^+$	1163.49 *10*	100	1172.91	2$^+$	E2	1.74×10^{-4} *2*	B(E2)(W.u.)=21 *+7−4* E_γ: 1163.5 *2* in ^{62}Co β^- decay (13.86 min), 1163.7 *1* in ^{26}Mg(^{48}Ca,2α4nγ), 1163.30 *18* in ^{48}Ca(^{18}O,4nγ), 1162.93 *25* in ^{59}Co(α,pγ), 1163.30 *15* in ^{61}Ni(n,γ), 1163.50 *12* in ^{62}Ni(n,n′γ).
2890.63	0$^+$	1717.80 *25*	100	1172.91	2$^+$	E2	2.55×10^{-4} *4*	E_γ: weighted average of 1717.6 *4* from ^{62}Cu ε decay (9.672 min), 1717.2 *4* from ^{59}Co(α,pγ), 1718.26 *25* from ^{61}Ni(n,γ) and 1717.53 *33* from ^{62}Ni(n,n′γ). Mult.: δ=−4.1 *+13−30* from (n,γ) (1970Fa06). Known J^π requires pure E2.
3058.79	(2)$^+$	722.21 *23*	48 *4*	2336.46	4$^+$	(E2)	5.58×10^{-4} *8*	B(E2)(W.u.)=17 *+8−6*

$^{62}_{28}$Ni$_{34}$-17

Adopted Levels, Gammas (continued)

$\gamma(^{62}Ni)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[&]	α[a]	Comments
								δ(E2/M1)=+1.6 *+3−9* from (n,n′γ) for J(3059)=3. E_γ: weighted average of 722.6 *3* from ^{59}Co(α,pγ), 722.0 *5* from ^{61}Ni(n,γ) and 722.02 *23* from ^{62}Ni(n,n′γ). I_γ: weighted average of 52.5 *75* from ^{59}Co(α,pγ), 38 *12* from ^{61}Ni(n,γ) and 47.3 *36* from ^{62}Ni(n,n′γ).
3058.79	(2)$^+$	756.90 *20*	96 *8*	2301.85	2$^+$	(M1+E2)		If M1, B(M1)(W.u.)=0.0087 *+39−31*. If E2, B(E2)(W.u.)=27 *+12−10*. δ(E2/M1)=−0.08 *2* from (n,n′γ) for J(3059)=3. E_γ: weighted average of 756.8 *3* from ^{61}Ni(n,γ), 757.1 *3* from ^{59}Co(α,pγ) and 756.85 *20* from ^{62}Ni(n,n′γ) Others: 748 in ^{62}Ni(p,p′γ), 756.3 in ^{63}Cu(n,npγ). I_γ: weighted average of 91 *15* from ^{61}Ni(n,γ) and 97.5 *75* from ^{59}Co(α,pγ). Others: 100 *6* in ^{62}Ni(n,n′γ), 100 in ^{62}Ni(p,p′γ), 100 in ^{63}Cu(n,npγ). B(M1)(W.u.)=0.0087 *+39−32* if M1, B(E2)(W.u.)=27 *+12−10* if E2.
		1885.9 *3*	100 *10*	1172.91	2$^+$	(M1+E2)		If M1, B(M1)(W.u.)=0.00059 *+26−21*. If E2, B(E2)(W.u.)=0.29 *+13−11*. δ(E2/M1)=−0.03 *+3−2* from (n,n′γ) for J(3059)=3. Others: −0.50 *8* (1989Ko54 in (n,n′γ)), +0.65 *+20−16* (1970Fa06) in (n,γ), both for J(3059)=2. E_γ: weighted average of 1886.3 *12* from ^{62}Co β^- decay (1.54 min), 1885.84 *34* from ^{62}Ni(n,n′γ), 1885.7 *3* from ^{59}Co(α,pγ) and 1886.2 *4* from ^{61}Ni(n,γ). Other: 1877 in ^{62}Ni(p,p′γ). I_γ: weighted average of 100 *24* from ^{61}Ni(n,γ), 100 *10* from ^{59}Co(α,pγ) and 100 *60* from ^{62}Co β^- decay (1.54 min). Others: 91.4 *76* in ^{62}Ni(n,n′γ), 42.86 in ^{62}Ni(p,p′γ). B(M1)(W.u.)=5.9×10^{-4} *+26−22* if M1, B(E2)(W.u.)=0.29 *+13−11* if E2.
		3060[b] *2*		0.0	0$^+$			E_γ: placement in (n,γ) with Iγ branching of 29 *6* (1970Fa06) is considered as uncertain by the evaluators, as this γ was neither seen in (n,n′γ) with Iγ branching of <2% (2011Ch05), nor in (α,pγ) (1978Oh04).
3157.95	2$^+$	856.08 *12*	12.3 *5*	2301.85	2$^+$	M1+E2	0.00031 *4*	E_γ: weighted average of 856.09 *12* from ^{62}Ni(n,n′γ) and 855.6 *5* from ^{61}Ni(n,γ). Other: 853 in ^{62}Ni(p,p′γ). I_γ: weighted average of 12.3 *40* from ^{62}Cu ε decay (9.672 min), 12.29 *51* from ^{62}Ni(n,n′γ) and 13.4 *49* from ^{61}Ni(n,γ). Other: 100 in ^{62}Ni(p,p′γ). B(M1)(W.u.)=0.0044 *+9−7* if M1, B(E2)(W.u.)=10.5 *+21−17* if E2.

$^{62}_{28}Ni_{34}$-18

$\gamma(^{62}Ni)$ (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult. [&]	δ [&]	α [a]	Comments
3157.95	2^+	1984.98 *28*	100 *4*	1172.91	2^+	(M1+E2)	+0.13 *8*	3.05×10^{-4} *5*	B(M1)(W.u.)=0.0028 *5*; B(E2)(W.u.)=0.021 *+35−18* δ: from (n,n′γ) (1970Fa06). E_γ: weighted average of 1985.1 *3* from ^{61}Ni(n,γ), 1984.93 *28* from ^{62}Ni(n,n′γ), 1985.0 *6* from ^{62}Co β^- decay (1.54 min), 1985.0 *10* from ^{62}Cu ε decay (9.672 min) and 1984.7 *6* from ^{59}Co(α,pγ). Others: 1982 in ^{62}Ni(p,p′γ), 1987 in ^{62}Ni(γ,γ').
		3158.2 *9*	47 *5*	0.0	0^+	E2		8.74×10^{-4} *12*	B(E2)(W.u.)=0.059 *+12−10* E_γ: weighted average of 3158.0 *15* from ^{62}Ni(n,n′γ), 3158.2 *10* from ^{62}Co β^- decay (1.54 min), 3158.2 *10* from ^{62}Cu ε decay (9.672 min), 3158.4 *9* from ^{59}Co(α,pγ) and 3158.0 *15* from ^{61}Ni(n,γ). Other: 3155 in ^{62}Ni(p,p′γ). I_γ: weighted average of 58.0 *68* from ^{62}Ni(n,n′γ), 47.6 *95* from ^{62}Co β^- decay (1.54 min), 60 *13* from ^{62}Cu ε decay (9.672 min), 38.9 *97* from ^{59}Co(α,pγ) and 41.5 *49* from ^{61}Ni(n,γ). Other: 100 in ^{62}Ni(p,p′γ).
3177.0	4^+	843.4 [b] *4*		2336.46	4^+				E_γ: from ^{26}Mg(^{48}Ca,2α4nγ) only, with Iγ=100 *22*. With such large intensity, this γ should have been detected in other studies. In (α,pγ), Iγ<9 for an uncertain 841γ. In (n,n′γ), 2011Ch05 mention that there was an indication of a 840-keV peak in the excitation function spectra, but sufficient spectroscopic information could not be extracted. This transition is considered uncertain by evaluators, and no intensity is assigned. Mult.: ΔJ=0, D+Q from $\gamma(\theta)$ in ^{26}Mg(^{48}Ca,2α4nγ); RUL suggests (M1+E2).
		875.0 *4*	6.9 *11*	2301.85	2^+	[E2]		3.36×10^{-4} *5*	B(E2)(W.u.)=6.7 *+23−16* E_γ: weighted average of 875.0 *4* from ^{62}Co β^- decay (13.86 min) and 875.0 *4* from ^{62}Ni(n,n′γ). Other: 875 in ^{59}Co(α,pγ). I_γ: weighted average of 6.8 *11* from ^{62}Co β^- decay (13.86 min) and 7.0 *11* from ^{62}Co β^- decay (13.86 min). Other: 14.4 in ^{59}Co(α,pγ).
		2003.9 *4*	100.0 *32*	1172.91	2^+	E2		3.70×10^{-4} *5*	B(E2)(W.u.)=1.54 *+46−30* E_γ: unweighted average of 2003.7 *3* from ^{62}Co β^- decay (13.86 min), 2005.1 *5* from ^{26}Mg(^{48}Ca,2α4nγ), 2003.25 *25* from

$^{62}_{28}$Ni$_{34}$-19

γ(^{62}Ni) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.&	δ&	α[a]	Comments
									^{48}Ca(^{18}O,4nγ) and 2003.62 *42* from ^{62}Ni(n,n′γ). I_γ: weighted average of 100.0 *32* from ^{62}Co β^- decay (13.86 min), 100 *7* from ^{26}Mg(^{48}Ca,2α4nγ) and 100.0 *42* from ^{62}Ni(n,n′γ). Other: 100 in ^{48}Ca(^{18}O,4nγ). Mult.: $\gamma(\theta)$ in ^{26}Mg(^{48}Ca,2α4nγ) and ^{62}Ni(n,n′γ), and RUL.
3257.66	2$^+$	369		2890.63	0$^+$				E_γ: from ^{62}Ni(p,p′γ).
		955.65 *28*	3.75 *21*	2301.85	2$^+$				E_γ,I_γ: from ^{62}Ni(n,n′γ).
		2084.6 *4*	100 *3*	1172.91	2$^+$	M1+E2	+1.03 *+22−70*	3.75×10^{-4} *27*	B(M1)(W.u.)=0.0016 *+10−4*; B(E2)(W.u.)=0.67 *+25−31* E_γ: weighted average of 2083.0 *20* from ^{62}Co β^- decay (1.54 min), 2084.2 *3* from ^{61}Ni(n,γ), 2084.8 *4* from ^{62}Cu ε decay (9.672 min), 2084.25 *41* from ^{62}Ni(n,n′γ) and 2085.3 *4* from ^{59}Co(α,pγ). Other: 2087 in ^{62}Ni(p,p′γ).
		3257.4 *10*	3.3 *4*	0.0	0$^+$	E2		9.15×10^{-4} *13*	B(E2)(W.u.)=0.0046 *+16−10* E_γ: weighted average of 3257.6 *12* from ^{62}Ni(n,n′γ) and 3257.3 *10* from ^{62}Cu ε decay (9.672 min). I_γ: weighted average of 3.32 *43* from ^{62}Ni(n,n′γ) and 3.0 *14* from ^{62}Cu ε decay (9.672 min).
3270.18	1$^+$,2$^+$	968.2 *4*	>12.1	2301.85	2$^+$				E_γ: weighted average of 968.2 *5* from ^{62}Cu ε decay (9.672 min), 968.20 *45* from ^{62}Ni(n,n′γ) and 968.2 *4* from ^{61}Ni(n,γ). I_γ: from ^{62}Cu ε decay (9.672 min). Others: >11.6 in ^{62}Ni(n,n′γ); <7.2 in ^{61}Ni(n,γ).
		1221.0 *26*	<97.6	2048.55	0$^+$				E_γ: weighted average of 1221.0 *3* from ^{62}Cu ε decay (9.672 min), 1221.04 *26* from ^{62}Ni(n,n′γ) and 1220.8 *4* from ^{61}Ni(n,γ). I_γ: from ^{62}Cu ε decay (9.672 min). Others: <97.7 in ^{62}Ni(n,n′γ); <72.2 in ^{61}Ni(n,γ).
		2097.32 *26*	100 *13*	1172.91	2$^+$				E_γ: weighted average of 2097.0 *10* from ^{62}Co β^- decay (1.54 min), 2097.6 *3* from ^{62}Cu ε decay (9.672 min), 2097.3 *3* from ^{61}Ni(n,γ) and 2097.15 *26* from ^{62}Ni(n,n′γ). Other: 2098 in ^{62}Ni(γ,γ′).
		3271.2 *10*	23.3 *28*	0.0	0$^+$				E_γ: weighted average of 3271.1 *10* from ^{62}Co β^- decay (1.54 min), 3271.4 *4* from ^{62}Cu ε decay (9.672 min), 3270 *1* from ^{61}Ni(n,γ) and 3270.0 *22* from ^{62}Ni(n,n′γ). I_γ: weighted average of 27.3 *91* from ^{62}Co β^- decay (1.54

$^{62}_{28}$Ni$_{34}$-20

Adopted Levels, Gammas (continued)

$\gamma(^{62}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[&]	δ[&]	α[a]	Comments
									min), 25.3 *36* from ^{62}Cu ε decay (9.672 min) and 22.2 *28* from ^{61}Ni(n,γ). Other: >23.3 in ^{62}Ni(n,n′γ).
3277.19	4^+	2104.20 *25*	100	1172.91	2^+	E2		4.15×10^{-4} *6*	B(E2)(W.u.)=3.0 *+17−8* E_γ: weighted average of 2104.7 *3* from ^{62}Co β^- decay (13.86 min), 2103.7 *3* from ^{26}Mg(^{48}Ca,2α4nγ), 2103.78 *25* from ^{48}Ca(^{18}O,4nγ), 2104.5 *3* from ^{59}Co(α,pγ) and 2104.52 *32* from ^{62}Ni(n,n′γ).
3369.97	1^+	479.36 *6*	2.8 *4*	2890.63	0^+	[M1]		9.59×10^{-4} *13*	B(M1)(W.u.)=0.014 *+6−4* E_γ: weighted average of 479.36 *6* from ^{62}Cu ε decay (9.672 min), 479.6 *10* from ^{61}Ni(n,γ) and 479.25 *64* from ^{62}Ni(n,n′γ). I_γ: weighted average of 2.82 *73* from ^{62}Cu ε decay (9.672 min) and 2.76 *53* from ^{62}Ni(n,n′γ). Other: 25 *19* in ^{61}Ni(n,γ);
		1067.66 *26*	15.6 *25*	2301.85	2^+	M1+E2	+1.6 *+41−11*	1.98×10^{-4} *17*	B(M1)(W.u.)=0.0020 *+40−16*; B(E2)(W.u.)=8.0 *+39−61* δ: from (n,n′γ) (2011Ch05). E_γ: weighted average of 1067.0 *10* from ^{62}Cu ε decay (9.672 min), 1067.6 *8* from ^{61}Ni(n,γ) and 1067.71 *26* from ^{62}Ni(n,n′γ). I_γ: weighted average of 7.7 *40* from ^{62}Cu ε decay (9.672 min), 21.9 *63* from ^{61}Ni(n,γ) and 16.6 *17* from ^{62}Ni(n,n′γ).
		1321.22 *33*	13.0 *13*	2048.55	0^+	[M1]		1.40×10^{-4} *2*	B(M1)(W.u.)=0.0032 *+14−8* E_γ: weighted average of 1321.1 *3* from ^{62}Cu ε decay (9.672 min), 1322.1 *6* from ^{61}Ni(n,γ) and 1321.11 *33* from ^{62}Ni(n,n′γ). I_γ: weighted average of 12.9 *28* from ^{62}Cu ε decay (9.672 min), 18.8 *63* from ^{61}Ni(n,γ) and 12.8 *13* from ^{62}Ni(n,n′γ).
		3369.91 *29*	100 *16*	0.0	0^+	(M1)		8.54×10^{-4} *12*	B(M1)(W.u.)=0.0015 *+6−3* Mult.: from $\gamma(\theta)$ in (n,n′γ) and RUL. E_γ: weighted average of 3369.5 *20* from ^{62}Co β^- decay (1.54 min), 3369.9 *3* from ^{62}Cu ε decay (9.672 min), 3370 *2* from ^{61}Ni(n,γ), 3371.0 *19* from ^{59}Co(α,pγ) and 3369.7 *17* from ^{62}Ni(n,n′γ).
3378		2205 *3*	100	1172.91	2^+				
3462	$1^+,2^+,3^+,4^+$	2289 *3*	100	1172.91	2^+				
3474.0	(0^+)	2301		1172.91	2^+				E_γ: preliminary data from (^{18}O,^{16}Oγ).

Adopted Levels, Gammas (continued)

$\gamma(^{62}Ni)$ (continued)

E_i(level)	J^{π}_i	E_γ[†]	I_γ[†]	E_f	J^{π}_f	Mult.[&]	δ[&]	α[a]	Comments
3486		1184 *3*	100	2301.85	2^+				
3518.70	2^+	360.5 *4*	2.58 *27*	3157.95	2^+				E_γ,I_γ: from (n,n′γ).
		459.54 *25*	9.6 *8*	3058.79	$(2)^+$	(M1+E2)		0.00042 *7*	E_γ: weighted average of 459.74 *25* from ^{61}Ni(n,γ) and 459.30 *28* from ^{62}Ni(n,n′γ). I_γ: weighted average of 7.8 *11* from ^{61}Ni(n,γ) and 10.04 *54* from ^{62}Ni(n,n′γ). B(M1)(W.u.)=0.054 *+48−19* if M1, B(E2)(W.u.)=1.7×10^2 *+15−6* if E2.
		1470.1 *5*	13.1 *8*	2048.55	0^+	E2		1.79×10^{-4} *3*	B(E2)(W.u.)=1.4 *+12−5* E_γ: weighted average of 1470.4 *5* from ^{61}Ni(n,γ) and 1469.88 *50* from ^{62}Ni(n,n′γ). I_γ: weighted average of 10.0 *22* from ^{61}Ni(n,γ) and 13.30 *54* from ^{62}Ni(n,n′γ).
		2345.71 *20*	100 *5*	1172.91	2^+	(M1+E2)	+0.32 *6*	4.54×10^{-4} *7*	B(M1)(W.u.)=0.0028 *+25−10*; B(E2)(W.u.)=0.09 *+9−4* δ: from (n,n′γ) (2011Ch05). Other: +0.44 *9* (from (n,γ), 1970Fa06). E_γ: weighted average of 2345.9 *10* from ^{62}Co β^- decay (1.54 min), 2345 *2* from ^{62}Cu ε decay (9.672 min), 2346.7 *5* from ^{59}Co(α,pγ), 2345.64 *20* from ^{61}Ni(n,γ) and 2345.33 *42* from ^{62}Ni(n,n′γ).
		3519.07 *21*	8.5 *15*	0.0	0^+	E2		1.01×10^{-3} *1*	B(E2)(W.u.)=0.011 *+10−4* E_γ: weighted average of 3519.0 *30* from ^{62}Co β^- decay (1.54 min), 3518 *3* from ^{61}Ni(n,γ) and 3519.08 *21* from ^{62}Ni(n,n′γ). I_γ: weighted average of 6.3 *31* from ^{62}Co β^- decay (1.54 min), 6.7 *22* from ^{61}Ni(n,γ) and 9.9 *15* from ^{62}Ni(n,n′γ).
3522.65	$(3)^+$	264.94 *25*	1.9 *4*	3257.66	2^+				E_γ: weighted average of 264.94 *25* from ^{61}Ni(n,γ) and 264.94 *25* from ^{62}Ni(n,n′γ). I_γ: from (n,γ).
		464.47 *32*	18 *10*	3058.79	$(2)^+$				E_γ: weighted average of 463.0 *8* from ^{59}Co(α,pγ), 464.63 *15* from ^{61}Ni(n,γ) and 463.33 *48* from ^{62}Ni(n,n′γ). I_γ: Uweighted average of 7.9 *48* from ^{59}Co(α,pγ) and 28.9 *39* from ^{61}Ni(n,γ). Other: >5.6 in ^{62}Ni(n,n′γ).
		1185.98 *18*	49.4 *8*	2336.46	4^+	E2+M1	−21 *+8−43*	1.70×10^{-4} *2*	B(E2)(W.u.)=12 *+12−5*

$^{62}_{28}Ni_{34}$-22

$\gamma(^{62}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[&]	α[a]	Comments
								E_γ: weighted average of 1186.4 *5* from ^{59}Co(α,pγ), 1185.9 *4* from ^{61}Ni(n,γ) and 1185.94 *18* from ^{62}Ni(n,n$'\gamma$). I_γ: weighted average of 50.8 *80* from ^{59}Co(α,pγ) and 48.1 *77* from ^{61}Ni(n,γ). Other: >33.3 in ^{62}Ni(n,n$'\gamma$).
3522.65	(3)$^+$	1220.88 *26*	100 *11*	2301.85	2$^+$			E_γ: weighted average of 1220.6 *4* from ^{59}Co(α,pγ), 1220.8 *4* from ^{61}Ni(n,γ) and 1221.04 *26* from ^{62}Ni(n,n$'\gamma$).
3524.4	0$^+$	2351.4 *4*	100	1172.91	2$^+$	E2	5.26×10^{-4} *7*	B(E2)(W.u.)=0.77 *+31−30* E_γ: from (n,n$'\gamma$).
3756.7	3$^-$	1454.76 *32*	90.7 *8*	2301.85	2$^+$	[E1]	2.76×10^{-4} *4*	B(E1)(W.u.)=4.2×10^{-4} *+11−7* E_γ: weighted average of 1454.9 *5* from ^{59}Co(α,pγ), 1455.2 *5* from ^{61}Ni(n,γ) and 1454.53 *32* from ^{62}Ni(n,n$'\gamma$). Other: 1438 in ^{62}Ni(p,p$'\gamma$). I_γ: weighted average of 80 *20* from ^{61}Ni(n,γ) and 92.3 *77* from ^{62}Ni(n,n$'\gamma$). Others: 100 *12* in ^{59}Co(α,pγ); 100 in ^{62}Ni(p,p$'\gamma$).
		2583.9 *5*	100 *8*	1172.91	2$^+$	(E1)	1.03×10^{-3} *1*	B(E1)(W.u.)=8.3×10^{-5} *+20−14* E_γ: weighted average of 2583.7 *5* from ^{59}Co(α,pγ), 2583.6 *12* from ^{61}Ni(n,γ) and 2584.11 *52* from ^{62}Ni(n,n$'\gamma$). Other: 2567 in ^{62}Ni(p,p$'\gamma$).
3849.57	(0,1,2)	579.42 *20*	100 *11*	3270.18	1$^+$,2$^+$			E_γ,I_γ: from ^{61}Ni(n,γ).
		1548.0 *5*	91 *36*	2301.85	2$^+$			E_γ,I_γ: from ^{61}Ni(n,γ).
3852.0?	(0$^+$)	2679[b]		1172.91	2$^+$			E_γ: preliminary data from (^{18}O,^{16}Oγ).
3859.6	(2)$^+$	968.2 *4*	33 *13*	2890.63	0$^+$	[E2]	2.61×10^{-4} *4*	B(E2)(W.u.)=41 *+12−14* E_γ,I_γ: from ^{62}Cu ε decay (9.672 min).
		3861.2 *11*	100 *13*	0.0	0$^+$	[E2]	1.14×10^{-3} *2*	B(E2)(W.u.)=0.123 *+13−15* E_γ: weighted average of 3861.7 *11* from ^{62}Cu ε decay (9.672 min), 3861.6 *17* from ^{59}Co(α,pγ) and 3860.0 *15* from ^{61}Ni(n,γ).
3967		1665 *3*	100	2301.85	2$^+$			E_γ: seen in (α,pγ), coincident with 2302γ.
3973.0	2$^+$	450.4 *7*	2.2 *11*	3522.65	(3)$^+$			E_γ,I_γ: from (n,γ).
		703.1 *6*	11 *4*	3270.18	1$^+$,2$^+$			E_γ,I_γ: from (n,γ).
		2799.4 *5*	100 *39*	1172.91	2$^+$			E_γ: from (n,γ). Others: 2805.2 *18* in (α,pγ); 2802 in (γ,γ'). I_γ: from (n,γ). Other: 79 *25* in (α,pγ).
		3972.0 *15*	67 *11*	0.0	0$^+$	[E2]	1.18×10^{-3} *2*	B(E2)(W.u.)=0.13 *+8−4* E_γ: from (n,γ). Others: 3974.2 *23* in (α,pγ); 3968 in (γ,γ'). I_γ: from (n,γ). Other: 100 *25* in (α,pγ).
4000.5	4$^+$	1664	100	2336.46	4$^+$			
4010.9		2837.9 *15*	100	1172.91	2$^+$			
4016.52	6$^+$	1681.5 *8*	100	2336.46	4$^+$	E2	2.42×10^{-4} *3*	B(E2)(W.u.)=4.7 *+35−15*

Adopted Levels, Gammas (continued)

γ(^{62}Ni) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[&]	δ[&]	α[a]	Comments
									E_γ: Uweighted average of 1679.8 *3* from ^{26}Mg(^{48}Ca,2αnγ), 1682.34 *21* from ^{48}Ca(^{18}O,4nγ) and 1682.3 *3* from ^{59}Co(α,pγ).
									Mult.: ΔJ=2, E2 in ^{48}Ca(^{18}O,4nγ); ΔJ=2, Q in ^{26}Mg(^{48}Ca,2α4nγ).
4041.4		885		3157.95	2^+				E_γ: from ^{62}Ni(p,p′γ).
		1738		2301.85	2^+				E_γ: from ^{62}Ni(p,p′γ).
4054.98	4^+	777.5 *3*	26.1 *29*	3277.19	4^+				E_γ,I_γ: from ^{62}Co β^- decay (13.86 min).
		1718.8 *5*	100 *8*	2336.46	4^+				E_γ: weighted average of 1718.7 *5* from ^{62}Co β^- decay (13.86 min) and 1719.1 *7* from ^{59}Co(α,pγ).
									I_γ: weighted average of 100.0 *73* from ^{62}Co β^- decay (13.86 min) and 100 *11* from ^{59}Co(α,pγ).
		1753.5 *8*	8.7 *29*	2301.85	2^+	[E2]		2.68×10^{-4} *4*	B(E2)(W.u.)=3.2 *+21−12*
									E_γ,I_γ: from ^{62}Co β^- decay (13.86 min).
		2882.3 *5*	16.0 *15*	1172.91	2^+	[E2]		7.60×10^{-4} *11*	B(E2)(W.u.)=0.49 *+26−13*
									E_γ: weighted average of 2882.3 *5* from ^{62}Co β^- decay (13.86 min) and 2882.7 *18* from ^{59}Co(α,pγ).
									I_γ: weighted average of 15.9 *15* from ^{62}Co β^- decay (13.86 min) and 24 *11* from ^{59}Co(α,pγ).
4062.5	1^+,2^+	1761.0 *5*	100 *20*	2301.85	2^+				E_γ,I_γ: from ^{61}Ni(n,γ).
		2015		2048.55	0^+				γ from ^{62}Ni(γ,γ′) only.
		4062.6 *10*	90 *10*	0.0	0^+				I_γ: weighted average of 4063.0 *10* from ^{62}Co β^- decay (1.54 min) and 4061 *2* from ^{61}Ni(n,γ).
									I_γ: from ^{61}Ni(n,γ).
4146.0	(4^+)	870[b]		3277.19	4^+				
		1844.1 *8*	100	2301.85	2^+	[E2]		3.03×10^{-4} *4*	B(E2)(W.u.)=5.4 *+26−20*
									E_γ,I_γ: from ^{59}Co(α,pγ).
4151.36	2^+,3	1092.42 *25*	100 *22*	3058.79	$(2)^+$				I_γ: weighted average of 1092.3 *3* from ^{59}Co(α,pγ) and 1092.50 *25* from ^{61}Ni(n,γ).
		1815.8 *8*	44 *22*	2336.46	4^+				E_γ,I_γ: from ^{61}Ni(n,γ).
		1850.0 *7*	67 *22*	2301.85	2^+				E_γ,I_γ: from ^{61}Ni(n,γ).
4154.2	(4^+)	1817.7 *3*	100	2336.46	4^+				E_γ: evaluators assume that 1815.8γ in (n,γ) and 1817.7γ in (α,pγ) are not the same.
4158.20	$(5)^-$	881.1 *2*	30.4 *22*	3277.19	4^+	(E1+M2)	−0.24 *6*	1.61×10^{-4} *14*	E_γ,I_γ: from ^{26}Mg(^{48}Ca,2α4nγ). Other: Eγ=883.54 *16*, Iγ=28.3 in ^{48}Ca(^{18}O,4nγ). The γ-ray energies in ^{26}Mg(^{48}Ca,2α4nγ) and ^{48}Ca(^{18}O,4nγ) differ by 2.4 keV *3*, evaluators have

Adopted Levels, Gammas (continued)

$\gamma(^{62}Ni)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[&]	δ[&]	α[a]	Comments
									arbitrarily adopted the value from $^{26}Mg(^{48}Ca,2\alpha4n\gamma)$. Mult.: from $^{48}Ca(^{18}O,4n\gamma)$; ΔJ=1, dipole in $^{26}Mg(^{48}Ca,2\alpha4n\gamma)$. δ: −0.24 *6* or −2.4 *4* in $^{48}Ca(^{18}O,4n\gamma)$, latter is unlikely from RUL for mult=(E1+M2).
4158.20	(5)$^-$	1821.4 *3*	100 *7*	2336.46	4$^+$	(E1+M2)	−0.16 *6*	5.35×10^{-4} *10*	E_γ,I_γ: from $^{26}Mg(^{48}Ca,2\alpha4n\gamma)$. Other: Eγ=1824.66 *22*, Iγ=100 $^{48}Ca(^{18}O,4n\gamma)$. The γ-ray energies in $^{26}Mg(^{48}Ca,2\alpha4n\gamma)$ and $^{48}Ca(^{18}O,4n\gamma)$ differ by 3.3 keV *4*, evaluators have arbitrarily adopted the value from $^{26}Mg(^{48}Ca,2\alpha4n\gamma)$. Mult.: from $^{48}Ca(^{18}O,4n\gamma)$; ΔJ=1, dipole in $^{26}Mg(^{48}Ca,2\alpha4n\gamma)$. δ: −0.16 *6* or −3.1 *4* in $^{48}Ca(^{18}O,4n\gamma)$, latter is unlikely from RUL for mult=(E1+M2).
4178.7	(6$^+$)	1001.4[‡] *5*	100[‡]	3177.0	4$^+$				E_γ: other: 1002 *3* in $^{59}Co(\alpha,p\gamma)$. A 1001γ was also placed from the 4158 level in $^{59}Co(\alpha,p\gamma)$ by 1978Oh04, but such a placement was not confirmed in any of the other in-beam γ-ray studies.
4201.1	(1$^+$,2,3)	678.5 *3*	100	3522.65	(3)$^+$				
4300.0		3127		1172.91	2$^+$				E_γ: from $^{62}Ni(p,p'\gamma)$.
4317.1	1,2$^+$	4318 *3*	100	0.0	0$^+$				
4407.0	2$^+$	3234		1172.91	2$^+$				E_γ: from $^{62}Ni(p,p'\gamma)$.
4415.9	1,2$^+$	1045.9 *4*	100 *20*	3369.97	1$^+$				E_γ,I_γ: from $^{61}Ni(n,\gamma)$.
		4416 *2*	80 *20*	0.0	0$^+$				E_γ,I_γ: from $^{61}Ni(n,\gamma)$.
4424	0$^+$,1$^+$,2$^+$	2122 *3*	100	2301.85	2$^+$				
4436.9	(3$^-$)	2135		2301.85	2$^+$				E_γ: from $^{62}Ni(p,p'\gamma)$.
4502.9	(3)$^-$	2201		2301.85	2$^+$				E_γ: from $^{62}Ni(p,p'\gamma)$.
4610.6	(1,2$^+$)	2562		2048.55	0$^+$				E_γ: from $^{62}Ni(p,p'\gamma)$.
4627.5	2$^+$,3	310.4 *5*	26 *11*	4317.1	1,2$^+$				E_γ,I_γ: from $^{61}Ni(n,\gamma)$.
		2289.7 *15*	80 *43*	2336.46	4$^+$				E_γ,I_γ: from $^{61}Ni(n,\gamma)$.
		3456 *3*	100 *29*	1172.91	2$^+$				E_γ,I_γ: from $^{61}Ni(n,\gamma)$.
4644.21	7$^-$	486.0 *1*	52 *3*	4158.20	(5)$^-$	E2		1.81×10^{-3} *3*	B(E2)(W.u.)=0.96 *+7−6* E_γ,I_γ: from $^{26}Mg(^{48}Ca,2\alpha4n\gamma)$. Other: Eγ=487.59 *13*, Iγ=52 $^{48}Ca(^{18}O,4n\gamma)$. The γ-ray energies in $^{26}Mg(^{48}Ca,2\alpha4n\gamma)$ and $^{48}Ca(^{18}O,4n\gamma)$ differ by 1.6 keV *2*, evaluators have arbitrarily adopted the value from $^{26}Mg(^{48}Ca,2\alpha4n\gamma)$. Mult.: from $^{48}Ca(^{18}O,4n\gamma)$.
		627.7 *1*	100 *4*	4016.52	6$^+$	(E1+M2)	−0.19 *4*	3.23×10^{-4} *19*	B(E1)(W.u.)=2.18×10^{-6} *12*; B(M2)(W.u.)=0.91 *+40−34*

$\gamma(^{62}Ni)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[&]	α[a]	Comments
								E_γ,I_γ: from $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$. Other: E$\gamma$=630.00 *14*, I$\gamma$=100 $^{48}Ca(^{18}O,4n\gamma)$. The γ-ray energies in $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$ and $^{48}Ca(^{18}O,4n\gamma)$ differ by 2.3 keV *2*, evaluators have arbitrarily adopted the value from $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$. Mult.: ΔJ=1, D+Q in $^{48}Ca(^{18}O,4n\gamma)$ and ΔJ^π; ΔJ=1, dipole in $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$. δ: −0.19 *4* or −2.3 *5* from $\gamma(\theta)$ in $^{48}Ca(^{18}O,4n\gamma)$, latter is less if mult=(M1+E2) from RUL. B(M2)(W.u.)=0.91 *+40−34* upper bound exceeds RUL=1.
4655.0	3^-	3482		1172.91	2^+			E_γ: from $^{62}Ni(p,p'\gamma)$.
4707.0		1549		3157.95	2^+			E_γ: from $^{62}Ni(p,p'\gamma)$.
4719.9	$(3)^-$	1661.3 *7*	100 *50*	3058.79	$(2)^+$			E_γ,I_γ: from $^{61}Ni(n,\gamma)$.
		3546 *2*	88 *25*	1172.91	2^+			E_γ,I_γ: from $^{61}Ni(n,\gamma)$.
4773.3	$(2^+,3,4^+)$	2440	100	2336.46	4^+			E_γ,I_γ: from $^{62}Ni(p,p'\gamma)$.
		3597	100	1172.91	2^+			E_γ,I_γ: from $^{62}Ni(p,p'\gamma)$.
4861.3	$(6)^-$	682.4[‡] *4*	11.2[‡] *24*	4178.7	(6^+)	[E1]	2.32×10^{-4} *3*	B(E1)(W.u.)=1.63×10^{-5} *+35−33*
		702.7 *7*	100 *8*	4158.20	$(5)^-$	(M1+E2)	0.00051 *9*	E_γ: unweighted average of 703.4 *2* from $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$ and 702.02 *14* from $^{48}Ca(^{18}O,4n\gamma)$. I_γ: from $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$. Mult.: from $\gamma(\theta)$ in $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$ and RUL. B(M1)(W.u.)=0.00680 *20* if M1, B(E2)(W.u.)=24.3 *7* if E2.
4999.7	$1,2^+$	2109		2890.63	0^+			E_γ: from $^{62}Ni(p,p'\gamma)$.
		3828 *2*	100 *18*	1172.91	2^+			E_γ,I_γ: from $^{61}Ni(n,\gamma)$.
		4998 *2*	82 *18*	0.0	0^+			E_γ,I_γ: from $^{61}Ni(n,\gamma)$.
5279.9		2978		2301.85	2^+			E_γ: from $^{62}Ni(p,p'\gamma)$.
5688.6	(8^-)	827.4[‡] *2*	100[‡]	4861.3	$(6)^-$	(Q)[‡]		
5746.64	(8^-)	885.0[‡] *3*	9.3[‡] *12*	4861.3	$(6)^-$			
		1102.5 *1*	100 *4*	4644.21	7^-	(M1+E2)	1.79×10^{-4} *14*	E_γ: weighted average of 1102.5 *1* from $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$ and 1102.41 *17* from $^{48}Ca(^{18}O,4n\gamma)$. I_γ: from $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$. Mult.: from $\gamma(\theta)$ in $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$ and RUL. Other: (E2) in $^{48}Ca(^{18}O,4n\gamma)$. B(M1)(W.u.)=0.027 *+16−8* if M1, B(E2)(W.u.)=40 *+24−11* if E2.
6320.2	(1,2)	3060		3257.66	2^+			E_γ: from $^{62}Ni(p,p'\gamma)$.
		5147		1172.91	2^+			E_γ: from $^{62}Ni(p,p'\gamma)$.
		6320		0.0	0^+			E_γ: from $^{62}Ni(p,p'\gamma)$.
6642.6	(9^-)	896.03 *27*	100 *6*	5746.64	(8^-)	D+Q		E_γ: unweighted average of 896.3 *2* from $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$ and

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Adopted Levels, Gammas (continued)

γ(^{62}Ni) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J$^\pi_f$	Mult.[&]	α[a]	Comments
								895.75 *16* from ^{48}Ca(^{18}O,4nγ). I$_\gamma$: 100 *6* in ^{26}Mg(^{48}Ca,2α4nγ); 100 in ^{48}Ca(^{18}O,4nγ). Mult.: from ^{26}Mg(^{48}Ca,2α4nγ).
6642.6	(9$^-$)	1998.00 *24*	64 *6*	4644.21	7$^-$	Q		E$_\gamma$: weighted average of 1998.1 *3* from ^{26}Mg(^{48}Ca,2α4nγ) and 1997.94 *24* from ^{48}Ca(^{18}O,4nγ). I$_\gamma$: 64 *6* in ^{26}Mg(^{48}Ca,2α4nγ); 80 in ^{48}Ca(^{18}O,4nγ). Mult.: from ^{26}Mg(^{48}Ca,2α4nγ).
7138.2	(8$^+$)	2493.9[‡] *4*	100[‡]	4644.21	7$^-$	D[‡]		
7170.3	(1,2)	5997	100	1172.91	2$^+$			E$_\gamma$,I$_\gamma$: from ^{62}Ni(p,p′γ).
		7170	100	0.0	0$^+$			E$_\gamma$,I$_\gamma$: from ^{62}Ni(p,p′γ).
7218.6	(10$^-$)	1530.0[‡] *4*	100[‡]	5688.6	(8$^-$)	(Q)[‡]		
7346.8	(10$^-$)	1658.4[‡] *3*	100[‡]	5688.6	(8$^-$)			
7555.3	(10$^-$)	912.7 *3*	71 *6*	6642.6	(9$^-$)	(M1+E2)	2.71×10^{-4} *31*	E$_\gamma$: unweighted average of 913.0 *2* from ^{26}Mg(^{48}Ca,2α4nγ) and 912.33 *16* from ^{48}Ca(^{18}O,4nγ). I$_\gamma$: from ^{26}Mg(^{48}Ca,2α4nγ). Other: 50 in ^{48}Ca(^{18}O,4nγ). Mult.: ΔJ=1, D+Q γ from γ(θ) in ^{26}Mg(^{48}Ca,2α4nγ). Other: ΔJ=(2), (E2) in ^{48}Ca(^{18}O,4nγ). B(M1)(W.u.)=0.015 *+13−5* if M1, B(E2)(W.u.)=31 *+27−11* if E2.
		1808.9 *4*	100 *6*	5746.64	(8$^-$)	(E2)	2.89×10^{-4} *4*	B(E2)(W.u.)=1.4 *+13−5* E$_\gamma$: unweighted average of 1809.3 *3* from ^{26}Mg(^{48}Ca,2α4nγ) and 1808.43 *22* from ^{48}Ca(^{18}O,4nγ). I$_\gamma$: from ^{26}Mg(^{48}Ca,2α4nγ). Other: 100 in ^{48}Ca(^{18}O,4nγ). Mult.: ΔJ=(2), (Q) γ from γ(θ) in ^{26}Mg(^{48}Ca,2α4nγ) and ^{48}Ca(^{18}O,4nγ); RUL.
7600.5	(1,2)	7600		0.0	0$^+$			E$_\gamma$: from ^{62}Ni(p,p′γ).
7645.7	1$^-$	3416[#]	1.9[#]	4230.0	0$^+$			
		3585[#]	3.3[#]	4062.5	1$^+$,2$^+$			
		3671[#]	4.9[#]	3973.0	2$^+$			
		3783[#]	3.3[#]	3859.6	(2)$^+$			
		3798[#]	0.6[#]	3849.57	(0,1,2)			
		4129[#]	2.4[#]	3518.70	2$^+$			
		4273[#]	3.3[#]	3369.97	1$^+$			
		4375[#]	3.4[#]	3270.18	1$^+$,2$^+$			
		4487[#]	2.7[#]	3157.95	2$^+$			
		5597[#]	25.8[#]	2048.55	0$^+$			

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$\gamma(^{62}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[&]	α[a]	Comments
7645.7	1^-	6473[#]	6.5[#]	1172.91	2^+			
		7646[#]	100[#]	0.0	0^+	E1		B(E1)(W.u.)=6.5×10^{-5} Mult.: from polarization measurement, ^{62}Ni(γ,γ').
7700.5	$(1,2)^-$	7700		0.0	0^+			E_γ: from ^{62}Ni(p,p'γ).
8200.6	(1,2)	8200		0.0	0^+			E_γ: from ^{62}Ni(p,p'γ).
8295.5	(10^+)	1157.3 *4*	100	7138.2	(8^+)	E2	1.76×10^{-4} *3*	E_γ,I_γ: from ^{26}Mg(^{48}Ca,2α4nγ). This γ is likely the same as 1157.24 *22* in ^{48}Ca(^{18}O,4nγ) placed from a 5805 level. Mult.: from ^{26}Mg(^{48}Ca,2α4nγ) and RUL.
8375.3	(11^-)	820.1[‡] *3*	67[‡] *11*	7555.3	(10^-)	(D+Q)[‡]		
		1732.5[‡] *3*	100[‡] *11*	6642.6	(9^-)			
8709.5	(10^-)	1154.3[‡] *3*	100[‡]	7555.3	(10^-)	D+Q[‡]		Mult.: ΔJ=0 transition.
8989.2	(12^-)	613.8[‡] *2*	78[‡] *8*	8375.3	(11^-)	D+Q[‡]		
		1433.8[‡] *2*	100[‡] *8*	7555.3	(10^-)	Q[‡]		
9698.7	(12^+)	1403.2[‡] *2*	100[‡]	8295.5	(10^+)	Q[‡]		
9924.4	(12^-)	935.0[‡] *2*	100[‡] *9*	8989.2	(12^-)	(D+Q)[‡]		Mult.: ΔJ=(0) transition.
		1215.0[‡] *3*	77[‡] *7*	8709.5	(10^-)	Q[‡]		
		2578.0[‡] *5*	24[‡] *4*	7346.8	(10^-)	(Q)[‡]		
(10596.1)	$1^-,2^-$	5596[@] *4*	3.0[@] *20*	4999.7	$1,2^+$			
		5877[@] *2*	6[@] *2*	4719.9	$(3)^-$			
		5968[@] *2*	14[@] *2*	4627.5	$2^+,3$			
		6179[@] *2*	20[@] *4*	4415.9	$1,2^+$			
		6277[@] *3*	8[@] *4*	4317.1	$1,2^+$			
		6364[@] *2*	10[@] *6*	4230.0	0^+			
		6387[@] *2*	8[@] *4*	4208.8	$0^+,1^+,2^+$			
		6395[@] *2*	10[@] *6*	4201.1	$(1^+,2,3)$			
		6445[@] *2*	24[@] *4*	4151.36	$2^+,3$			
		6532[@] *2*	36[@] *8*	4062.5	$1^+,2^+$			
		6623[@] *2*	34[@] *6*	3973.0	2^+			
		6738[@] *3*	24[@] *6*	3859.6	$(2)^+$			
		6748[@] *3*	26[@] *6*	3849.57	(0,1,2)			
		6840.0 *15*		3756.7	3^-			E_γ: from (n,γ).
		7073[@] *3*	30[@] *14*	3522.65	$(3)^+$			
		7078.0[@] *15*	72[@] *14*	3518.70	2^+			

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Adopted Levels, Gammas (continued)

$\gamma(^{62}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[&]	Comments
(10596.1)	$1^-,2^-$	7326.0[@] *15*	96[@] *8*	3270.18	$1^+,2^+$		
		7338[@] *2*	28[@] *6*	3257.66	2^+		
		7436[@] *2*	40[@] *6*	3157.95	2^+		
		7537 *2*		3058.79	$(2)^+$		E_γ: from (n,γ).
		7703.4[@] *15*	26[@] *12*	2890.63	0^+		
		8296[@] *3*	16[@] *4*	2301.85	2^+		
		8551.3[@] *15*	92[@] *10*	2048.55	0^+		
		9422.3[@] *5*	100[@] *10*	1172.91	2^+		
		10594.6[@] *7*	74[@] *16*	0.0	0^+		
11335.2	(14^+)	1636.5[‡] *3*	100[‡]	9698.7	(12^+)	(Q)[‡]	
11478.0	(14^-)	1553.6[‡] *2*	100[‡]	9924.4	(12^-)	Q[‡]	
13288.4	(16^+)	1953.2[‡] *3*	100[‡]	11335.2	(14^+)	Q[‡]	
13441.8	(16^-)	1963.8[‡] *3*	100[‡]	11478.0	(14^-)	Q[‡]	
15554.5	(18^+)	2266.0[‡] *4*	100[‡]	13288.4	(16^+)	Q[‡]	
15875.0	(18^-)	2433.1[‡] *5*	100[‡]	13441.8	(16^-)	Q[‡]	
18187.9	(20^+)	2633.4[‡] *5*	100[‡]	15554.5	(18^+)	(Q)[‡]	
18669.7	(20^-)	2794.7[‡] *6*	100[‡]	15875.0	(18^-)	(Q)[‡]	
21315.5	(22^+)	3127.5[‡] *3*	100[‡]	18187.9	(20^+)	(Q)[‡]	
21851.8	(22^-)	3182[‡] *2*	100[‡]	18669.7	(20^-)	(Q)[‡]	
25453	(24^-)	3601[‡] *4*	100[‡]	21851.8	(22^-)		

[†] As noted in comments from various datasets. For many unplaced γ rays (not listed here), see (n,γ) E=thermal dataset.

[‡] From $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$.

[#] From $^{62}Ni(\gamma,\gamma')$.

[@] From $^{61}Ni(n,\gamma)$.

[&] From $\gamma(\theta)$ and RUL, (n,γ), (n,n$'\gamma$), $^{48}Ca(^{18}O,4n\gamma)$ and $^{48}Ca(^{18}O,4n\gamma)$. Evaluators assign mult=Q for $\Delta J=2$, quadrupole, and D or D+Q for $\Delta J=1,0$ dipole, as conversion data or linear polarization data to assign electric or magnetic nature are not available, but when level half-lives are known, mult=Q are assigned E2, and mult=D+Q as (M1+E2) from RUL. Note that 2016Al18 in $^{26}Mg(^{48}Ca,2\alpha 4n\gamma)$ assigned E2 for $\Delta J=2$, quadrupole, and M1+E2 or E1 for $\Delta J=1,0$ transitions. Exceptions are noted.

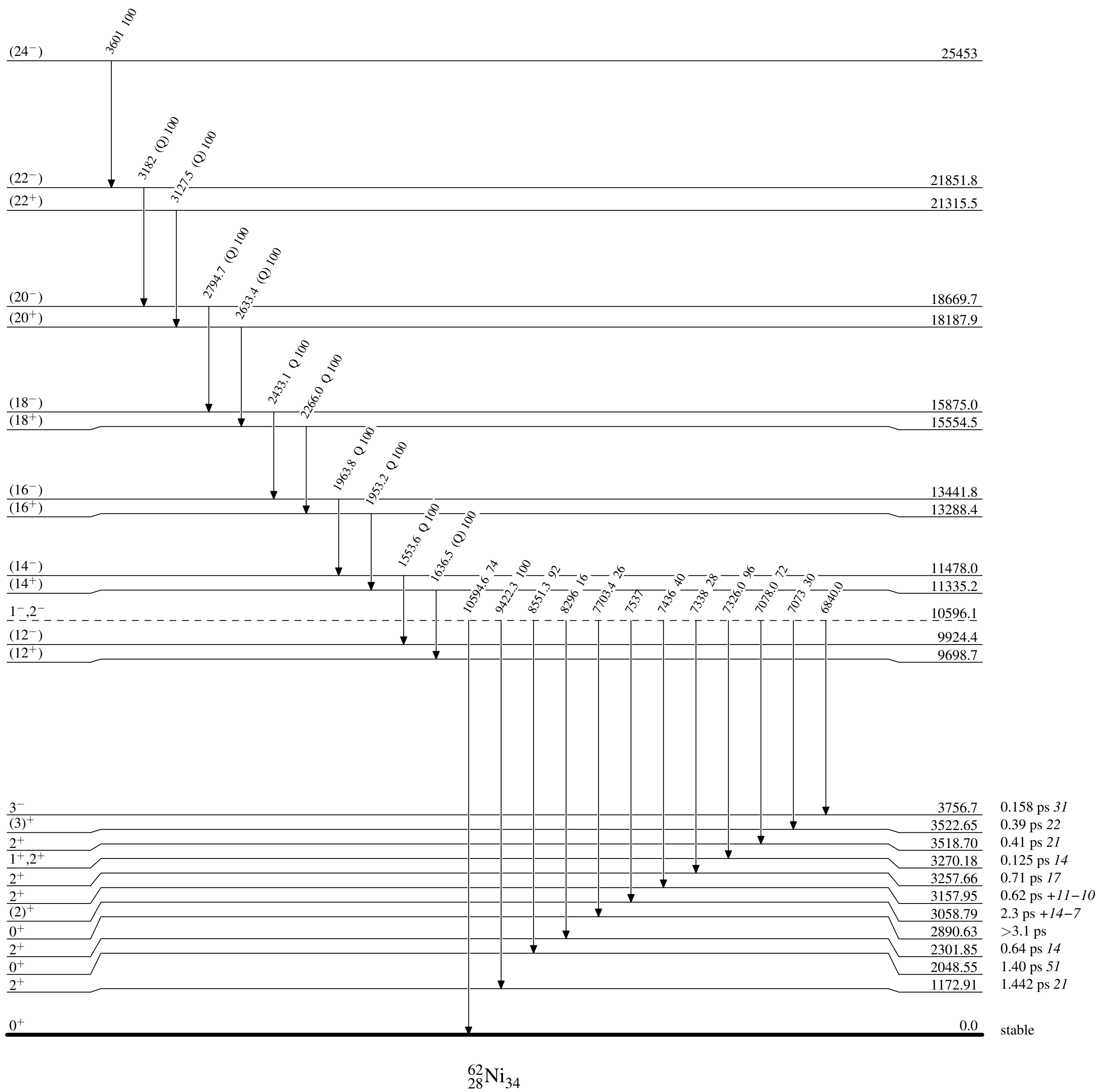
[a] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[b] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

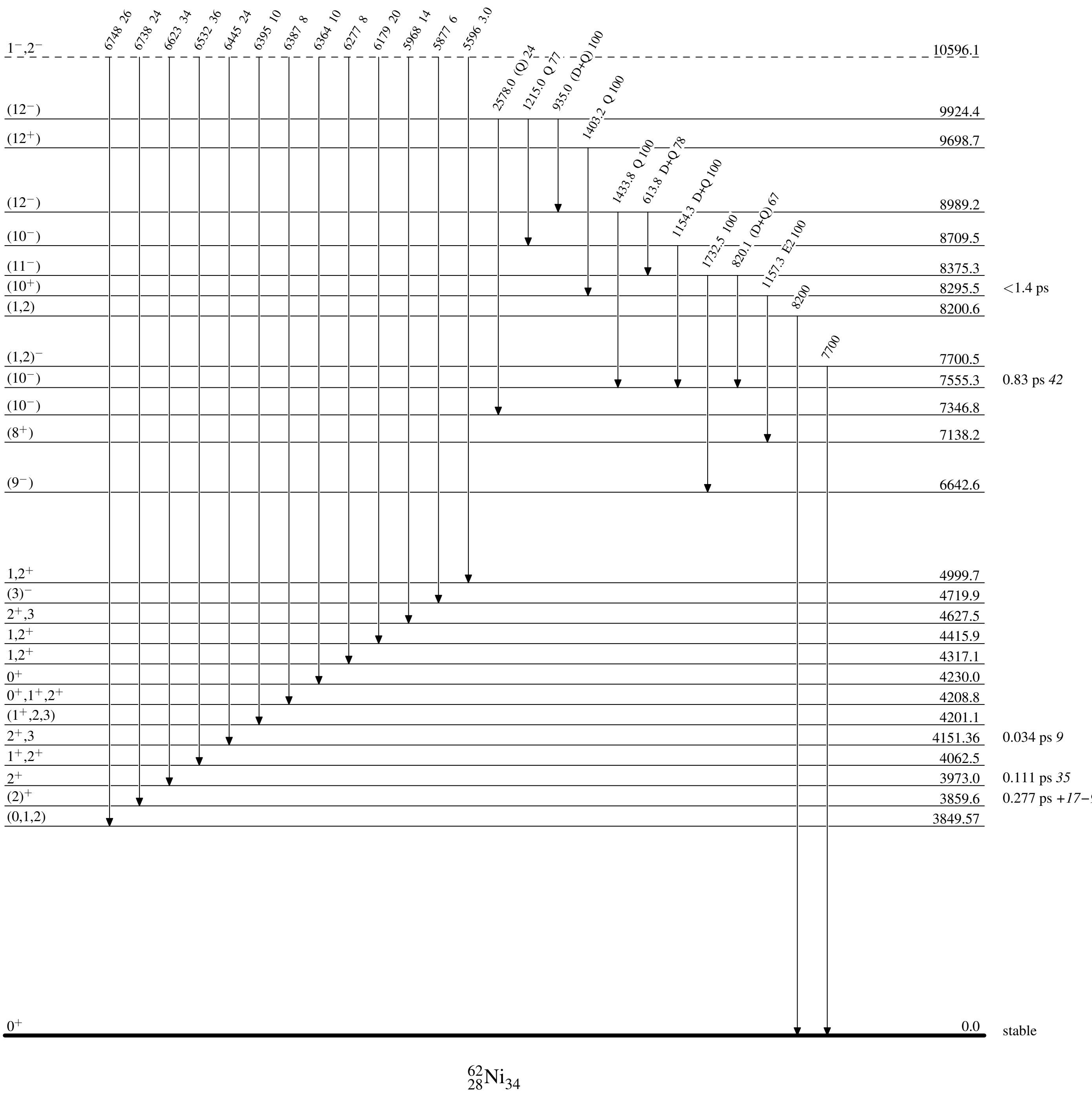
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

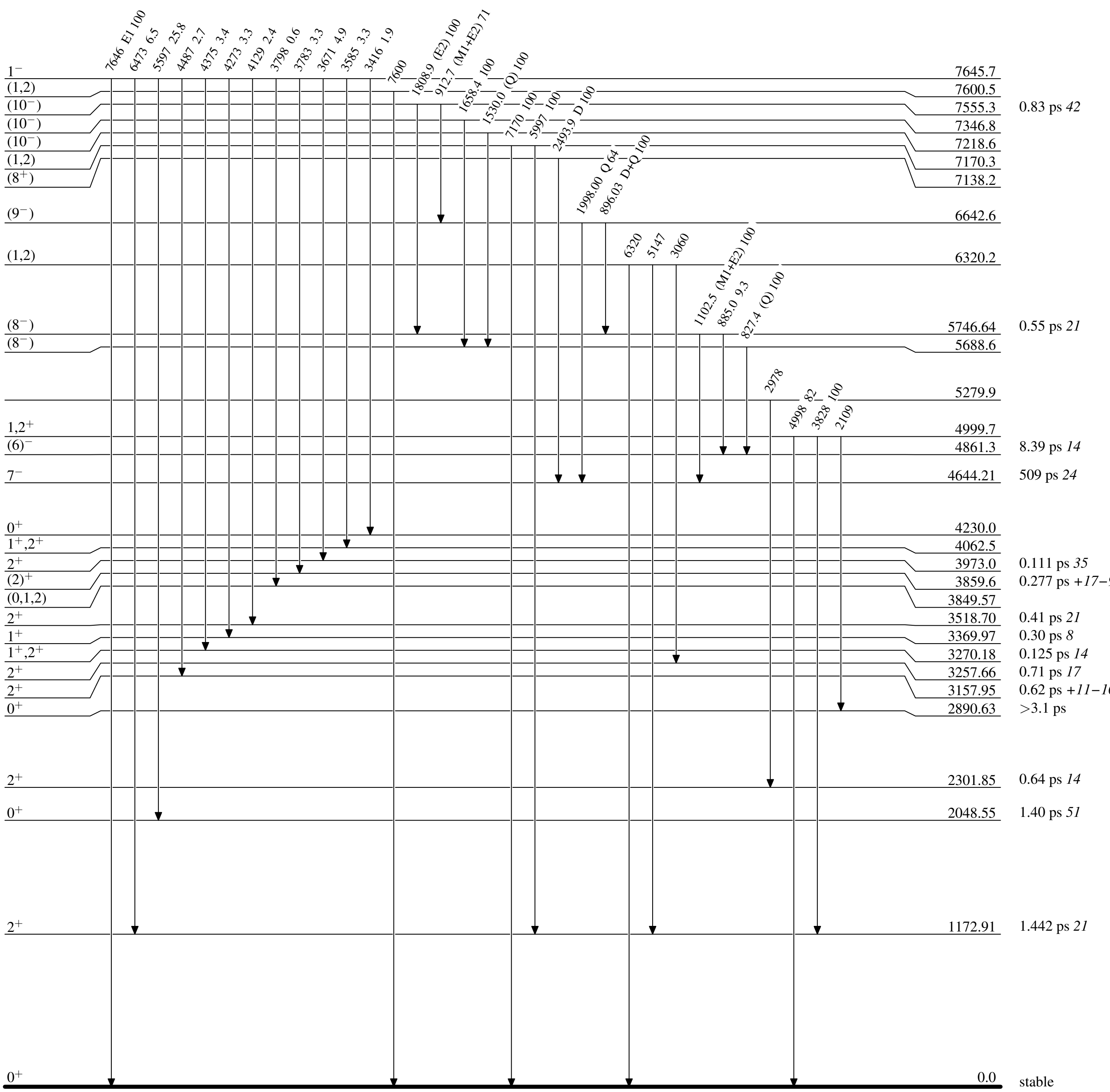
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



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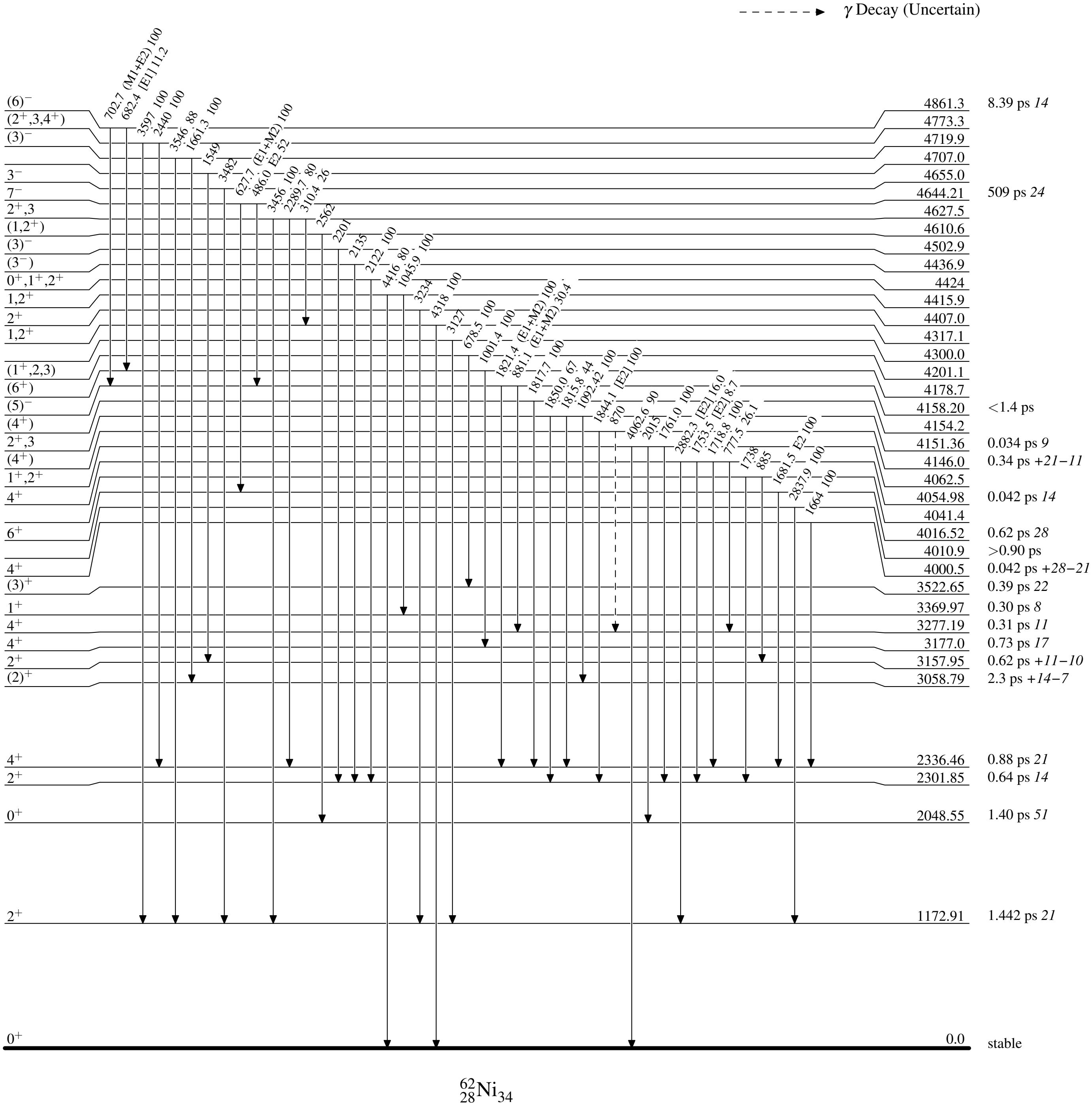
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



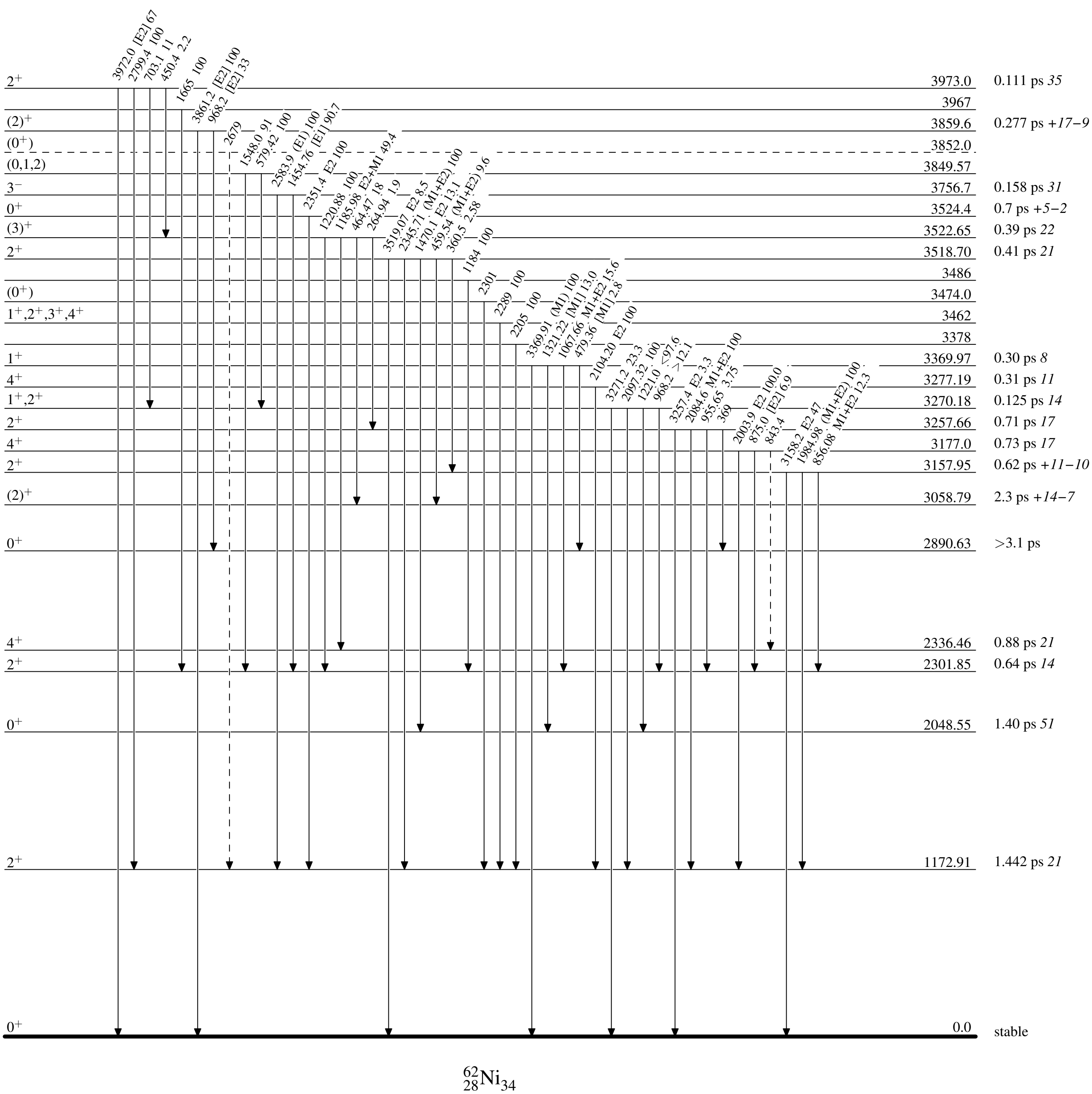
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)

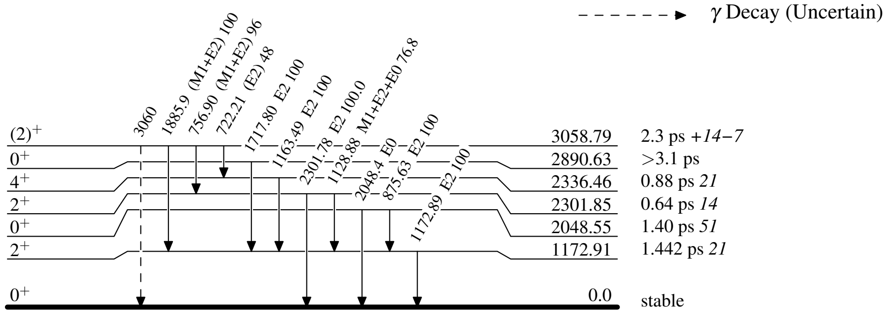


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level



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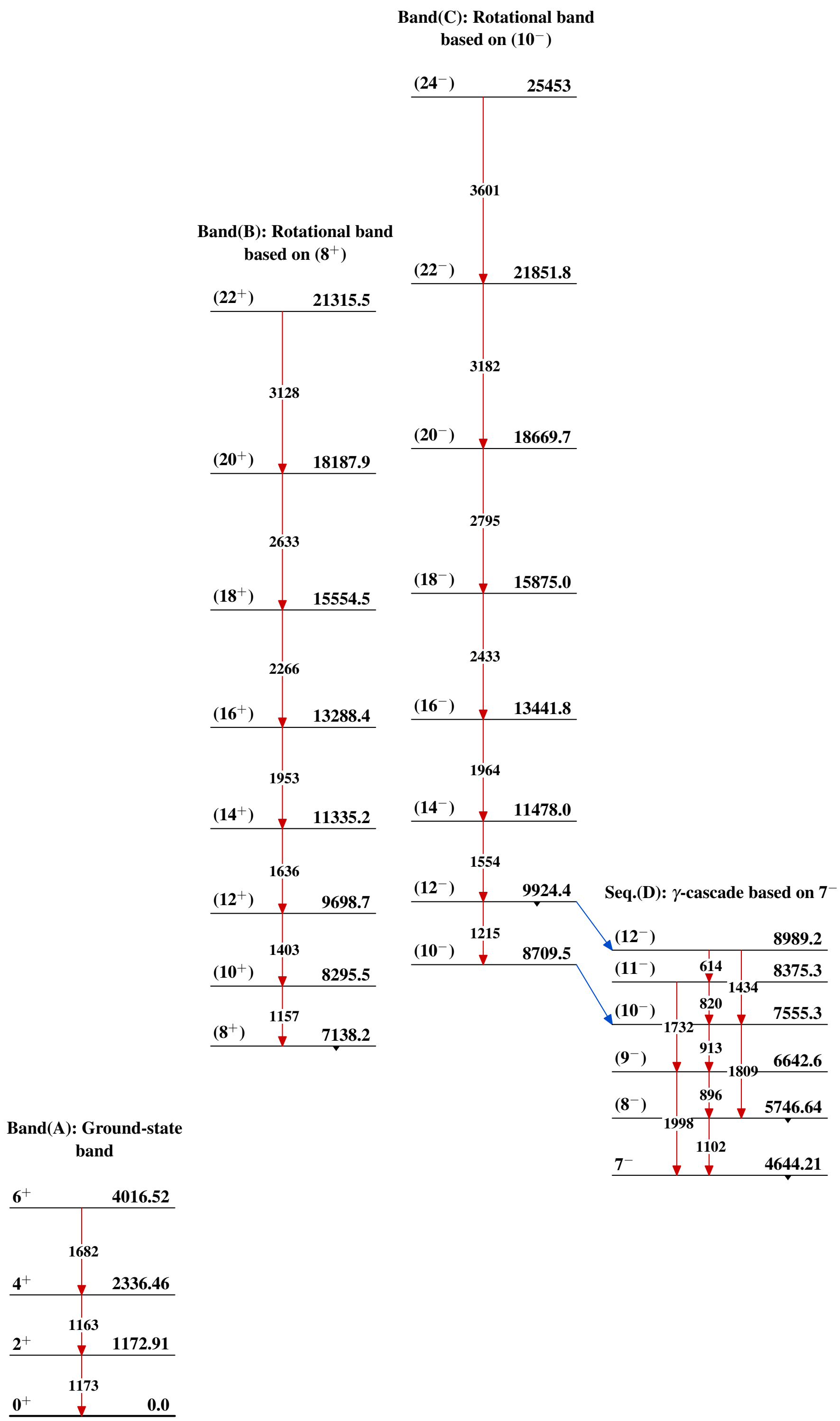
Adopted Levels, Gammas



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