Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Caroline D. Nesaraja, Scott D. Geraedts and Balraj Singh	NDS 111, 897 (2010)	12-Jan-2010

Q(β^-)=−8561.0 *5*; S(n)=12216.3 *5*; S(p)=8172.2 *5*; Q(α)=−6399.2 *4* 2012Wa38
Note: Current evaluation has used the following Q record.
S(2n)=22467 *11*, S(2p)=14200.2 *6* (2009AuZZ).
Q(β^-)=−8565.6 *14*; S(n)=12217.0 *18*; S(p)=8172.4 *5*; Q(α)=−6400.0 *6* 2009AuZZ,2003Au03
Other reactions:
^{56}Fe(^{12}C,^{10}Be): 1998Pa43: E=60 MeV, $\sigma(\theta)$.
Additional information 1.
^{58}Ni(^{6}Li,^{6}Li′): 1994Sa33,1989Na11; elastic and inelastic scattering. Extracted deformation parameters, optical model potential.
^{58}Ni(^{6}Li,^{6}Li): 2000Sc11: E=600 MeV; 2009Ag02: E=9.9, 11.2, 12.1, 13.0, 14.0 MeV; measured σ, $\sigma(\theta)$.
^{58}Ni(^{7}Li,^{7}Li′): 2000Gu17, 1999Gu02: E=42 MeV, $\sigma(\theta)$.
^{58}Ni(pol ^{7}Li,^{7}Li): 1995De06: E=70.5 MeV, $\sigma(\theta)$, Ay(θ).
^{58}Ni(^{7}Be,^{7}Be): 2009Ag02: E=15.1, 17.1, 18.5, 19.9, 21.4 MeV; measured σ, $\sigma(\theta)$.
^{58}Ni(^{8}B,^{8}B): 2009Ag02: E=20.7, 23.4, 25.3, 27.2, 29.3 MeV; measured $\sigma(\theta)$.
^{58}Ni(^{8}B,p^{7}Be): 2008Ag11: E=25.0, 26.9, 28.4 MeV; measured light fragment energy spectra, $\sigma(\theta)$, excitation functions.
^{58}Ni(^{12}C,^{12}C), (^{12}C,^{12}C′): 1987FeZX; DWBA analysis extracted deformation parameters.
^{58}Ni(^{14}N,^{14}N′): 1990Ga07; studied relationship between centroid and Γ of giant quadrupole resonance and neutron binding energy.
^{58}Ni(^{18}O,^{18}O): 1997Si13: E=35.1-55.1 MeV, $\sigma(\theta)$.
^{58}Ni(^{28}Si,^{28}Si): 2003Ga18: E=74-77 MeV, $\sigma(\theta)$.
^{58}Ni(^{46}Ti,^{46}Ti′), (^{58}Ni,^{58}Ni′), (^{62}Ni,^{62}Ni′): 2000Va28: E=96.9-116.5 MeV, $\sigma(\theta)$.
^{58}Ni(^{58}Ni,^{58}Ni): 2007Hi06: E=220-260 MeV, $\sigma(\theta)$.
^{58}Ni(^{58}Ni,^{58}Ni): 1996Va10: E=220-240 MeV, $\sigma(\theta)$.
^{58}Ni(^{58}Ni,^{58}Ni): 1994Me24: E=200 MeV, $\sigma(\theta)$.
^{58}Ni(π,π), ^{58}Ni(π^+,$\pi^{+\prime}$), ^{58}Ni(π^-,$\pi^{-\prime}$): 1996La04, 1991Ra22, 1989Oa01; strong absorption model analysis of elastic scattering to extract deformation.
^{58}Ni mesic atoms, pionic x-rays: 1990Ku08, interaction shifts, and widths.
^{58}Ni(d,n): 1993InZZ; deduced occupation probabilities of proton orbits.
^{58}Ni(α,α): 1992Du08; analysis of total cross section data to extract mean square radii of matter distribution.
Cu(K$^-$,γ): 1972Ba55.
Structure calculations (levels, transition probabilities, etc.): 2009Be24, 2007Sv01, 2006Va21, 2004Ho08, 1999Ha21, 1977Ko02, 1975Va08, 1974Pa13, 1972Gl05, 1972Ob02.

^{58}Ni Levels

Individual values of τ in ps for first 2$^+$ state at 1454 keV that were used in averaging are given below:

1. Deduced from BE2 measurement in Coulomb excitation: 0.82 *16* (1960An07, earlier value of 0.67 *17* in 1959Al95), 0.95 *6* and 1.04 *22* (1960Go08), 0.88 *9* (1962St02), 0.860 *20* (1970Le17), 0.924 *28* (1971ChZF), 0.83 *17* (2004Yu10).
2. From Γ in (γ,γ'): 0.62 *20* (1964Bo22), 0.98 *9* (1970Me18), 1.07 *8* (1972ArZD), 0.90 *11* (1981Ca10).
3. From B(E2) in (e,e′): 0.956 *16* (1967Du07), 1.14 *6* (1969Af01), 1.07 *9* (1983Kl09). Uncertainties in B(E2) are statistical, 15% for systematic uncertainty as suggested in 1967Du07 is added in quadrature. Other: 0.65 *9* (1961Cr01), not included in the averaging procedure.
4. From DSAM in (p,p′γ): 0.94 *12* (1969Be48), 0.92 *17* (1973BeYD).
5. From DSAM in (n,n′γ): 1.00 ps *+15−10* (2008Or02,weighted average of two measurements at E(n)=1.6 and 1.8 MeV). Value of 42 fs *12* from 1989Ge09 is discrepant and highly suspect.
6. From DSAM in Coulomb excitation: 1.27 *2* (2001Ke08), uncertainty is increased to 0.07 to take into account 5% systematic uncertainty due to stopping powers, as suggested by one of the authors of 2001Ke08 in an e-mail reply in December 2007. It should be pointed that this value stands as the highest amongst all the others and is higher by ≈35% from the precise values deduced from BE2 values in Coulomb excitation. In the e-mail reply, the author of 2001Ke08 claimed that their measurements are reliable for two main reasons: a) the γ rays were detected in coincidence with scattered ^{12}C ions thus giving clean γ-ray spectra,

Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

b) high ion velocities in inverse kinematics used for the first time. In a thesis by 2005NiZS where lifetime of first 2^+ state in ^{22}Ne was measured using Coulomb excitation technique and ^{nat}Ni and 107Ag as targets, the results for first 2^+ state in ^{22}Ne were found to be consistent in the two measurements only when BE2 value for first 2^+ state from Coulomb excitation data was used. Use of the lifetime from 2001Ke08 gave inconsistent results.

Cross Reference (XREF) Flags

A	^{58}Cu ε decay (3.204 s)	J	^{54}Fe(^{12}C,^{8}Be)	S	^{58}Ni(^{3}He,^{3}He′)
B	^{59}Zn εp decay (182.0 ms)	K	^{54}Fe(^{16}O,^{12}C)	T	^{58}Ni(α,α')
C	^{28}Si(^{36}Ar,α2pγ)	L	^{56}Fe(^{3}He,n)	U	^{58}Ni(^{6}Li,^{6}Li′)
D	^{28}Si(^{36}Ar,αpγ):prompt p decay	M	^{56}Fe(α,2nγ)	V	Coulomb excitation
E	^{40}Ca(^{24}Mg,α2pγ)	N	^{58}Ni(γ,γ'),(pol γ,γ')	W	^{60}Ni(p,t)
F	^{45}Sc(^{16}O,p2nγ)	O	^{58}Ni(e,e′)	X	Ni(K$^-$,x rayγ)
G	^{48}Ti(^{12}C,2nγ)	P	^{58}Ni(n,n′),(n,n′γ)	Y	^{58}Ni(^{16}O,^{16}O′)
H	^{54}Fe(^{6}Li,d)	Q	^{58}Ni(p,p′),(pol p,p′),(p,p′γ)	Z	^{58}Ni(^{18}O,^{18}O′)
I	^{54}Fe(^{7}Li,t)	R	^{58}Ni(d,d′)		

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$[#]	XREF	Comments
0.0[l]	0^+	stable	ABCDEFGHIJKLMNOPQRSTUVWXYZ	$T_{1/2}$: >7.0×10^{20} y for decay by double $\varepsilon\beta^+$ channel to the 0^+ g.s. of ^{58}Fe, and>4.0×10^{20} y for decay by the same mode to the 2^+, 811-keV level of ^{58}Fe (1993Va19). Others: 1984No09, 1982Be20.
1454.21[l] *9*	2^+	0.652 ps *21*	ABCDEFGHIJK MNOPQRST VWXYZ	μ=+0.076 *18* (2001Ke02,2005St24) Q=−0.10 *6* (1974Le13,1989Ra17) $<r^2>^{1/2}$=3.7748 fm *14* (2004An14 evaluation). J$^{\pi}$: E2 γ to 0^+. $T_{1/2}$: different averaging methods were employed to 20 independent values given in header comments above but minimum uncertainty was assigned as 5%, which required increasing the uncertainty by a factor of ≈2 to values in 1970Le17 and 1971ChZF. Average values of τ in ps obtained are: 0.95 *3* by weighted average, normalized χ^2=2.0; 0.95 *9* by limitation of statistical weights method (the uncertainties is increased to overlap the most precise value of 0.86 *4*); 0.931 *21* by normalized residuals method (NRM), normalized χ^2=1.2; 0.926 *21* by Rajeval′s technique, normalized χ^2=1.0. The evaluators adopt 0.94 *3* as in 2008Or02; this value overlaps all the averaging methods used. 2001Ra27 evaluation (which did not include 2008Or02, 2004Yu10 and 2001Ke08) lists τ=0.904 ps *26*. μ: transient field integral perturbed angular correlation (2001Ke02). Other: −0.12 *24* (1978Ha13,1989Ra17). Q: reorientation in Coulomb excitation (1974Le13,1970Le17). See also 2005St24 compilation.
2459.21[l] *14*	4^+	3.7 ps *4*	BCDEFGH JK M OPQRST VWX	J$^{\pi}$: ΔJ=2, E2 γ to 2^+; L(α,α')=4. $T_{1/2}$: from 2001Ke08, Coulomb excitation.
2775.42 *14*	2^+	0.38 ps *+12−9*	AB HI K NOPQR T W	$T_{1/2}$: from DSA In (p,p′γ). $T_{1/2}$=57 fs *+25−13* from

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	Jπ[‡]	T$_{1/2}$[#]	XREF	Comments
				B(E2) In (e,e′) is In disagreement. Jπ: L(α,α′)=2.
2902.15 *21*	1+[h]	69 fs +*15*−*14*	A H N PQ t	Configuration=ν(p$_{3/2}$f$_{5/2}$) ((p,p′),1986Ho15).
2942.56 *18*	0+	1.46 ns *14*	A H NOPQ St W	T$_{1/2}$: from γγ(t) in ^{58}Cu decay (1970Ra34). Other: 2.01 ns *7* in (p,p′γ) (1971St02) is in disagreement. Value from decay work is preferred due to cleaner γ-ray spectra such studies than in reaction data. Jπ: E0 transition to g.s..
3037.86 *16*	2+	57 fs *8*	AB H NOPQRST VW	Jπ: L(α,α′)=2. T$_{1/2}$: unweighted average of 75 fs *7* (2001Ke08, Coulomb excitation), 40 fs *6* from (p,p′γ), 47 fs +*13*−*9* from (γ,γ′), 66 fs *6* from (e,e′).
3263.66 *22*	2+	37 fs *5*	AB H K NOPQRST VW	Jπ: L(α,α′)=2. T$_{1/2}$: unweighted average of 53 fs *8* (2001Ke08, Coulomb excitation), 30 fs *4* from (γ,γ′), 25 fs *4* from (p,p′γ), 44 fs *21* from (n,n′γ), 33 fs *3* from (e,e′).
3269.1 *8*	(2)[i]	>57[@] fs	N	
3273.7 *7*	(2)[i]	>50[@] fs	N	
3420.55[q] *18*	3+	0.26 ps +*22*−*10*	C K PQ T W	Jπ: L(p,p′)=2+4 gives 3+ uniquely.
3450.9 *5*		>11[@] fs	N	
3524 *5*	4+		I R T	Jπ: L(α,α′)=4.
3531.1 *3*	0+	0.19 ps *6*	A H KL OPQ	Jπ: E0 transition to g.s. L=0 in (^{6}Li,d), (^{3}He,n); also E0 in (e,e′).
3593.71 *25*	1,2+	33 fs *9*	A N PQ T	Jπ: γ to 0+; population in (γ,γ′). T$_{1/2}$: DSA In (p,p′γ). Other: 39 fs *7* from (γ,γ′).
3620.09[q] *22*	4+	0.11 ps +*8*−*5*	BCDEFGH K M OPQ ST W	Jπ: L(α,α′)=4; ΔJ=2, E2 γ to 2+.
3775.0 *3*	3+	0.28 ps +*14*−*7*	K PQ T W	Jπ: L(p,p′)=2+4 gives 3+ uniquely.
3870			R	
3898.8 *4*	2+	23 fs *6*	AB H K NOPQR T W	Jπ: L(α,α′)=2. T$_{1/2}$: unweighted average of 13 fs +*10*−*5* from (γ,γ′), 34 fs +*8*−*6* from (e,e′), and 23 fs *3* from (p,p′γ).
3943.6 *12*		>24[@] fs	N	
4020			I O Q	
4105.9 *3*	(4+)		C E	Jπ: ΔJ=(2), Q γ to 2+. E(level): this level is different from 4107.7, 2+.
4108.4 *3*	2+	128 fs *55*	H K NOPQRST W	Jπ: L(p,p′)=2. T$_{1/2}$: unweighted average of 65 fs *10* from (p,p′γ), 0.14 ps +*9*−*4* from (e,e′), 0.10 ps +*16*−*4* from (γ,γ′).
4260 *80*	(2+)		L	E(level): broad peak, from energy matching it could correspond to 4295 level, but Jπ′s are different. Jπ: L(^{3}He,n)=2.
4294.7 *4*	4+	24 fs +*22*−*18*	C K OPQ W	Jπ: 4 from (e,e′); γ to 2+ and RUL.
4347.9 *12*		17 fs +*15*−*13*	k PQ T W	
4358.7 *7*	(2+,3,4+)		E k Q	Jπ: γ′s to 2+ and 4+.
4383.0[q] *3*	(5+)		CDEFG M Q T	Jπ: ΔJ=1, (M1+E2) γ to 4+.
4404.3 *4*	4+	43 fs +*17*−*14*	C PQ T W	Jπ: L(α,α′)=4.
4449.6 *4*	1+,2+		A QR T	Jπ: log *ft*=5.1 from 1+.
4474.6 *5*	3−[a]	22 fs *6*	B HI K OPQRST W	T$_{1/2}$: weighted average of 19 fs *8* from (p,p′γ),

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
				and 24 fs *8* from (n,n′γ). B(E3)(↑)=0.0176 *16* (2002Ki06 evaluation, adopted from (e,e′)).
4518.3 *8*			Q W	
4538.0 *6*	0^+[a]	31 fs *11*	A OPQ T	
4574.1 *5*	1[i]	21[@] fs *3*	J N Q	XREF: N(?).
4752.2 *8*	4^+		B O QRST W	XREF: S(4720). Jπ: L(α,α′)=4. E(level): weighted average of 4750 *5* (e,e′), 4750 *7* (p,t), 4750 *8* (α,α′), 4755 *5* (p,p′).
4920.0 *6*			Q	
4954.0 *8*	1[i]	14[@] fs *2*	N	
4964.7 *3*	(5^+)		C E Q	Jπ: ΔJ=1 γ to 4^+.
5064.3 *10*			I Q	
5084 *5*			Q	
5127.5[l] *4*	6^+[ah]		CDEFGH M O Q T	
5156 *11*	2^+		W	Jπ: L(p,t)=2.
5166 *10*	1^+[h]		Q	Configuration=$\nu(p_{3/2}p_{1/2})$ ((p,p′),1986Ho15).
5170.3 *10*			K Q S	
5359.3? *16*	(2)[i]	>29[@] fs	N	
5384.5[q] *4*	6^+		CDE H Q	Jπ: ΔJ=1, E1 γ from 7^-; ΔJ=2, Q γ′s to 4^+.
5394.0 *9*		41[@] fs *8*	H N T	
5436.3 *10*	4^+		O Q	Jπ: L(p,p′)=4.
5452.2 *4*	1[i]	>13[@] fs	N Q	
5472.3 *8*	4^+		Q W	Jπ: L(p,p′)=4 for 5470 *5*, and L(p,t)=4 for 5488 *11*.
5503.5 *10*			Q	
5528.0 *4*	(1)[i]	>7[@] fs	N	
5589.0 *7*	(5^-)		CD H t	Jπ: L(α,α′)=4+5 for a doublet; γ from 7^-; L(^{6}Li,d)=(5,6).
5590.3 *10*	2^+		Q ST W	Jπ: L(α,α′)=2.
5594.2 *6*	4^+[a]		K O Q t	XREF: O(5585).
5706.3 *8*			Q	
5744.7 *5*	(6^+)		C	Jπ: ΔJ=2, Q γ to 4^+.
5748.5 *8*	2^+		Q	Jπ: L(p,p′)=2.
5766.3 *8*	4^+		Q	Jπ: L(p,p′)=4.
5803.3 *7*			Q	
5824.6 *11*			Q	
5896.4 *7*			H o Q S	
5905.3 *7*	1^+[i]	25[@] fs *4*	No	E(level): In (e,e′), level is At 5909 *8* with J=2 In one study and 5903 *15* In another with J=1, with assumed natural-parity states. IT is possible that it is doublet In (e,e′) representing 1^+ and 2^+ levels.
5906 *5*	2^+		o Q	Jπ: L(p,p′)=2. E(level): see comment for 5905.3 level.
5924 *10*	(0^+)[b]		o Q w	
5942.4 *10*	(0^+)[b]		o Q w	
5963 *10*	(0^+)[b]		Q w	
5967 *8*	$2^+,3^-$[a]		O	
5982 *10*	(0^+)[b]		I Q w	
6018.4 *10*	3^-[a]		O Q	
6027.3 *7*	1^-	0.85[@] fs *5*	H k NO Q T	Jπ: L(α,α′)=1; J=1 from (γ,γ′); Jπ=2^+ favored in (e,e′), but 1^- is not ruled out.

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	XREF	Comments
6067.5[q] 4	(7$^+$)		CDEF Q	J^π: ΔJ=2, Q γ to (5$^+$); ΔJ=1, (M1+E2) γ to 6$^+$.
6084.7 5	7$^-$		CDE Q	J^π: ΔJ=1, E1 γ to 6$^+$; γ to 4$^+$ not ΔJ=1, D+Q.
6116 10			Q	
6145 15	3[$^-$][a]		O	
6174.3 8	2$^+$,3$^-$[a]		O Q	XREF: O(6182).
6199 10			H Q	
6220 10			Q	
6220.0 4	(7$^+$)		C E	J^π: ΔJ=1 γ to 6$^+$; ΔJ=(2) γ to (5$^+$).
6228.3 6	(2$^+$)[a]		o Q	J^π: 2$^+$,(1$^-$) In (e,e′) for a 6235 8 level.
6248 10	(2$^+$)[a]		o Q	J^π: 2$^+$,(1$^-$) In (e,e′) for a 6235 8 level.
6271 10			Q	
6274.3 10	4[+][a]		O Q	
6308.5 6	3$^-$		Q T	J^π: L(p,p′)=3.
6316 10	1$^-$,2$^+$[a]		O Q	
6360.6 11			Q w	
6389 10			Q w	
6402.4 10			i Q w	
6417 5	2$^+$		i O Q w	J^π: L(p,p′)=2, also (e,e′).
6424.9? 9	1[i]	9.3[@] fs 13	N	
6430.7? 10	1[i]	6.9[@] fs 7	N	
6437 10			hi Q S w	
6447 10			hi K Q	E(level): there is a level at 6450 50 in (^{16}O,^{12}C).
6460 5	4$^+$		Q T	J^π: L(p,p′)=4.
6468.4 7	(1$^+$)[a]		O Q	J^π: 1$^+$,(2$^-$) from (e,e′).
6478.4 7	2$^+$		Q	J^π: L(p,p′)=2.
6500 10			Q	
6507.2 11			Q	
6549 10	(4$^+$)[c]		Q w	
6571.4 10	2$^+$		Q	J^π: L(p,p′)=2.
6598 10	(4$^+$)[c]		F Q w	
6601.3 8			Q	
6604.6[l] 4	(8$^+$)		CDEFG M	XREF: G(?)M(?). J^π: ΔJ=2, Q γ to 6$^+$; ΔJ=1, (M1+E2) γ to 7$^+$; band assignment.
6665.4 7			Q	
6674 10			Q	
6685.0? 9	1[i]	3.6[@] fs 4	N	
6714 10			Q w	
6717.4 7			Q w	
6735 8	3$^-$		O T w	J^π: L(α,α′)=3; also (e,e′).
6752 5	2$^+$		Q	J^π: L(p,p′)=2.
6763.5 10	3$^-$[f]		hi O Q s	E(level): level at 6780 in (^{3}He,^{3}He′) where ΔE=25 keV for strong and 50 keV for weak levels.
6793 10	3$^-$[f]		iJk Q s	
6805.5 10	3$^-$[f]		hiJk Q s	E(level): level at 6780 30 in (^{7}Li,t), level at 6800 50 in (^{16}O,^{12}C).
6816 8	(2$^+$)[a]		O Q	J^π: 2$^+$,(1$^-$) In (e,e′).
6845.7 7	(7$^+$)		C	J^π: γ′s to (5$^+$) and 6$^+$.
6854.5 10	3$^-$[a]		H O Q T W	XREF: Q(6844). E(level): level at 6860 40 in (p,t).
6863.1 6	(6)		C	J^π: ΔJ=1, D γ to (5$^+$). Negative parity assigned by 2009Jo03 In (^{36}Ar,α2pγ).
6886 10	(2$^+$,3$^-$)[d]		l Q	
6892.9? 15	(1)[i]	11[@] fs 5	N	

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^{58}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
6912 *10*	$(2^+,3^-)$[d]		l Q	
6925 *10*	4^+[e]		o Q	
6935 *10*	4^+[e]		o Q	
6960 *10*			Q	
6983 *5*	2^+		O Q	J^{π}: L(p,p′)=2; also (e,e′).
6992.5 *10*			Q	
7017 *10*			i Q	
7042 *10*			i o Q	
7048.2 *9*	1^-[i]	0.83[@] fs *3*	i No	
7051 *5*	4^+		i o Q	J^{π}: L(p,p′)=4.
7054.5 *10*			i o Q T	
7068 *5*	4^+		Q	J^{π}: L(p,p′)=4.
7089 *10*			o Q	
7109 *8*	(2^+)[a]		i O	J^{π}: $4^{(+)}$ is also suggested In (e,e′).
7111 *5*	3^-		i Q	J^{π}: L(p,p′)=3.
7113.5[&] *7*	$(1,2^+)$		i Q	
7131.5 *10*			i Q	
7141 *5*	4^+		i Q	J^{π}: L(p,p′)=4.
7180 *25*	3^-		S w	J^{π}: L(^{3}He,^{3}He′)=3.
7210.4 *10*	3^-		H K O Q T w	J^{π}: L(p,p′)=3; also (e,e′); L(α,α′)=4 is inconsistent.
7249.6 *11*	(1)[i]	9[@] fs *3*	N	
7255 *5*	2^+		O Q	J^{π}: L(p,p′)=2; also (e,e′).
7271.7 *7*	1[i]	0.99[@] fs *11*	N Q	J^{π}: possible negative parity since No analog GT state seen In ^{58}Cu from (^{3}He,t) (2002Fu07).
7273.7 *6*	7^-		C	J^{π}: ΔJ=1, E1+M2 γ to 6^+; ΔJ=0, D+Q γ to 7^-.
7300.5 *10*	3^-		O Q	J^{π}: L(p,p′)=3.
7314.8[q] *5*	(8^+)		C	J^{π}: ΔJ=1, D+Q γ to (7^+); ΔJ=2, Q γ to 6^+.
7380.5 *10*	$(1,2^+)$		Q	J^{π}: γ to 0^+.
7388.8 *4*	1^+[i]	1.00[@] fs *5*	NO	
7420 *5*	3^-		Q	J^{π}: L(p,p′)=3.
7446.2[q] *5*	(9^+)		C EF	J^{π}: ΔJ=1, (M1+E2) γ to (8^+); ΔJ=2, Q γ to (7^+).
7462 *8*	(1^+)[a]		O Q	J^{π}: 1^+,(2^-) In (e,e′).
7514.5 *10*	3^-[a]		hi l O Q ST	
7560 *8*	1^+[a]		Hi kl O	
7570.5 *10*	2^+		kl Q	J^{π}: L(p,p′)=2.
7585.1 *6*			N	
7595.9 *6*	(2)[i]	5.2[@] fs *8*	N	
7603 *8*	(1^-)[a]		O	
7616.0? *10*	(1)[i]	9.5[@] fs *40*	N	
7618 *5*	4^+		Q	J^{π}: L(p,p′)=4.
7680.6 *10*	1^-[a]		O Q	
7709.7 *6*	1^+[i]	0.72[@] fs *3*	J NO Q	Configuration=$\nu(f_{7/2}^{-1}f_{5/2})$ ((p,p′),1986Ho15).
7721 *10*			I Q T	
7724.3[r] *5*	(8^+)		C	J^{π}: ΔJ=2 γ to 6^+; ΔJ=0, D+Q γ to (8^+).
7748 *8*	$(1^+,2^-)$[a]		O Q	
7766.0 *7*	(1)[i]	3.7[@] fs *6*	N	
7807.3 *5*	1^-[i]	0.81[@] fs *10*	K N Q	
7820 *8*	$4[+]$[a]		H O	
7858 *5*	3^-		Q	J^{π}: L(p,p′)=3.
7860 *5*	4^+		Q	J^{π}: L(p,p′)=4.
7862.6[&] *7*	$(1,2^+)$		Q	J^{π}: γ to 0^+.
7876.7 *26*	1[i]	0.9[@] fs *5*	N	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
7937 *25*	8^-[a]		H O	
7973.6 *6*	(8^+)		C	Jπ: ΔJ=2 γ to (6^+); ΔJ=1, D+Q γ to 7^+.
7982.8 *6*	(8^-)		C	Jπ: ΔJ=1, D+Q γ to (7^+); ΔJ=1, (M1+E2) γ to 7^-.
8068.6? *12*	(1^-)[i]	1.38[@] fs *17*	N	
8074.5 *7*	(8^+)		C	Jπ: ΔJ=1, D+Q γ to (7^+).
8096.3 *6*	1[i]	1.6[@] fs *3*	N	
8100 *15*	4[+][a]		K O T	XREF: K(8060).
8110.6 *10*	$(1,2^+)$		Q	Jπ: γ to 0^+.
8115.1 *6*	(8^-)		C	Jπ: γ to 7^-.
8120.8[r] *5*	(9^+)		C E	Jπ: ΔJ=1, D+Q γ's to (8^+).
8134 *5*	3^-		Q	Jπ: L(p,p′)=3.
8143 *10*			Q	
8203 *20*	(1^+)[g]		K Q	
8237.3 *4*	1^-[i]	0.15[@] fs *+3−2*	NO Q	Jπ: 1^+ suggested in (e,e′) is in disagreement, if the level is the same as in (γ,γ′).
8276 *8*	1^+[ag]		O Q	Jπ: 1^+,(2^-) In (e,e′).
8317.1 *17*	1[i]	1.9[@] fs *3*	N Q	
8372 *20*	(1^+)[g]		Q	
8395 *8*	2^+[a]		O	
8395.1 *12*	1^-[i]	0.40[@] fs *8*	N Q	
8419 *10*	1^+[gh]		Q	Configuration=$\nu(f^{-1}_{7/2}f_{5/2})$ ((p,p′),1986Ho15).
8461.0 *7*	1^+[gi]	0.51[@] fs *3*	N Q	
8475 *8*	2^-[a]		O	
8493 *15*	$(3^-,1^-)$		T	Jπ: L=(3,1) in (α,α′).
8514.1 *4*	1^-[i]	0.66[@] fs *5*	NO Q	Jπ: 1^+ suggested in (e,e′) is in disagreement, if the level is the same as in (γ,γ′).
8552.7 *13*	$1^{(+)}$	0.97[@] fs *8*	N Q	Jπ: from analysis of σ(θ) in (p,p′), J=1 from (γ,γ′). Configuration=$\nu(p_{3/2}p_{1/2})$ ((p,p′),1986Ho15).
8600.5 *7*	1^+[agi]	0.57[@] fs *6*	NO Q	
8654 *9*	$(3^-,1^-)$		Q T	E(level): unweighted average of 8645 *10* (p,p′), and 8662 *15* (α,α′). Jπ: L=(3,1) in (α,α′).
8679.3 *8*	1^+[agi]	0.223[@] fs *11*	NO Q	
8692			Q	
8716 *10*			Q	
8718.1 *6*	(9^-)		C	Jπ: ΔJ=1, (M1+E2) γ to (8^-); γ to 7^-.
8780 *8*	2^-[a]		O	
8797 *5*	3^-		Q	Jπ: L(p,p′)=3.
8808 *25*	8^-[a]		O	
8817 *8*	(1^+)[a]		O	Jπ: 1^+,(2^-) In (e,e′).
8830 *40*	2^+		W	Jπ: L(p,t)=2.
8845 *5*	3^-		O Q	Jπ: L(p,p′)=3; 2^+,3^- from (e,e′).
8857.4 *6*	$1^{(+)}$[gi]	0.61[@] fs *12*	N Q	
8880.2 *6*	1^-[i]	0.390[@] fs *17*	N Q	
8896.4? *10*			C	Jπ: γ to (8^+) suggests $(8,9,10^+)$.
8902 *5*	4^+		J Q	Jπ: L(p,p′)=4.
8934.6 *5*	$1^{(-)}$[i]	0.310[@] fs *11*	NO	Jπ: parity from (e,e′).
8961.3 *7*	1^+[agi]	1.20[@] fs *13*	NO Q	
9012 *5*	3^-		Q	Jπ: L(p,p′)=3.
9027.2 *7*	(9^-)		C	Jπ: ΔJ=2 γ to 7^-; γ to (8^-).
9037 *8*	(1^+)[a]		O	Jπ: 1^+,(2^-) In (e,e′).
9062.7[r] *6*	(10^+)		C	Jπ: ΔJ=2 γ to (8^+); ΔJ=1, (M1+E2) γ to (9^+).

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
9073.4 *6*	1^+[agi]	0.51[@] fs *3*	NO Q	
9113 *10*			O	
9156.9 *7*	1^+[agi]	0.77[@] fs *10*	NO Q	
9190.7 *5*	1^-[i]	0.58[@] fs *6*	N Q	J^{π}: (1^+) suggested in (p,p′) is in disagreement, if the level is the same as in (γ,γ').
9251 *10*	(1^+)[g]		O Q	
9295 *10*	1^+[h]		o Q T	Configuration=$\nu(f_{7/2}^{-1}f_{5/2})$ ((p,p′),1986Ho15).
9304 *5*	3^-		o Q	J^{π}: L(p,p′)=3.
9310 *40*	4^+		W	J^{π}: L(p,t)=4.
9322.1[q] *9*	(11^+)		C	J^{π}: ΔJ=2 γ to (9^+).
9326.4 *6*	1[i]	0.33[@] fs *5*	N Q	
9336 *20*	(1^+)[g]		Q	
9345.5 *6*	(10^-)		C E	XREF: E(?). J^{π}: ΔJ=2 γ to (8^-); ΔJ=1, (M1+E2) γ to (9^-).
9368.5 *6*	$1^{(+)}$[ai]	0.37[@] fs *4*	NO	J^{π}: 1^+,(2^-) In (e,e′); $1^{(-)}$ In (γ,γ').
9379 *5*	3^-		Q	J^{π}: L(p,p′)=3.
9407 *10*	(2^-)[a]		O	J^{π}: 2^-,(1^+) In (e,e′).
9436 *5*	4^+		Q	J^{π}: L(p,p′)=4.
9455.4 *18*	1[i]	2.1[@] fs *4*	N	
9458 *5*	3^-		O Q	J^{π}: L(p,p′)=3.
9523.3 *13*	1^-[i]	0.118[@] fs *13*	NO Q	J^{π}: 1^+,(2^-) suggested in (e,e′) and (1^+) in (p,p′) are in disagreement, if the levels in these two reactions are the same as in (γ,γ').
9554.0 *21*	1[i]	0.335[@] fs *20*	K NO	XREF: K(9500). J^{π}: (2^-) In (e,e′).
9585.2[o] *8*	(9^-)		C	J^{π}: ΔJ=2 γ to 7^-; ΔJ=1, D γ to (8^+).
9588 *5*	4^+		Q	J^{π}: L(p,p′)=4.
9630.5 *24*	1[i]	0.15[@] fs *3*	N	
9632 *5*	4^+		Q	J^{π}: L(p,p′)=4.
9643 *10*	(2^-)[a]		O	J^{π}: 2^-,(1^+) In (e,e′).
9666.9 *8*	(10^+)		C	J^{π}: ΔJ=2 γ to (8^+); ΔJ=1, D+Q γ to (9^+).
9667 *10*	2^-[a]		O	
9667.8 *15*	1[i]	0.38[@] fs *13*	N	
9672 *5*	3^-		Q	J^{π}: L(p,p′)=3.
9723.0 *9*	$1^{(-)}$[i]	0.109[@] fs *16*	N	
9750 *10*	1^+[ag]		O Q	J^{π}: 1^+,(2^-) In (e,e′).
9790.6 *10*	(10^+)		C	J^{π}: ΔJ=1, D+Q γ to (9^+).
9799 *10*			O	
9835 *5*	3^-		Q	E(level): doublet in (p,p′), 3^- and 1^+ levels, the latter corresponds to 9842 level here. J^{π}: L(p,p′)=3.
9843 *5*	1^+[gh]	0.26[@] fs *+27−10*	NO Q	E(level): possible IAS of 1050,1^+ In ^{58}Co. $T_{1/2}$: from (γ,γ') for J=1. Configuration=$\nu(p_{3/2}p_{1/2})$ ((p,p′),1986Ho15).
9870 *5*	3^-		O Q	J^{π}: L(p,p′)=3. J^{π}=(2^-) In (e,e′).
9886.8 *7*	(10^+)		C	J^{π}: ΔJ=2 γ to (8^+).
9890 *40*	2^+		K W	J^{π}: L(p,t)=2.
9929 *5*	3^-		l Q	J^{π}: L(p,p′)=3.
9941 *10*	(2^+)[a]		O	J^{π}: 2^+,(1^-) In (e,e′).
9956 *5*	3^-		l Q	J^{π}: L(p,p′)=3.
10029 *5*	3^-		O Q	J^{π}: L(p,p′)=3. J^{π}=(2^-) In (e,e′).
10059 *5*	4^+		Q	J^{π}: L(p,p′)=4.

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
10073 *10*	1^{+}[a]	O	
10107 *10*	1^{+}[ag]	O Q	
10120 *5*	4^{+}	K Q	XREF: K(10100). J^{π}: L(p,p′)=4.
10137.2 *12*	(10^{+})	C	
10144.7 *6*	(10^{-})	C	
10157 *10*	1^{+}[eg]	O Q	E(level): possible IAS of 1377,1^{+} In ^{58}Co.
10180.8 *6*	(11^{-})	C	
10190 *25*	8^{-}[a]	O	
10192.5[r] *7*	(11^{+})	C	
10209 *5*	3^{-}	Q	J^{π}: L(p,p′)=3. E(level): note that 10209 and 10214 are two different levels in (p,p′).
10214 *10*	1^{+}[a]	O Q	J^{π}: also from 0° data in (p,p′) (2007Fu04) In (p,p′). E(level): possible IAS of 1435, 1^{+} In ^{58}Co.
10249 *5*	4^{+}	Q	J^{π}: L(p,p′)=4.
10266 *10*	1^{+}[a]	O	
10293.5 *11*	(9^{-})	C	
10304 *10*		Q	
10355 *10*	1^{+}[a]	O	
10365 *5*	4^{+}	Q	J^{π}: L(p,p′)=4.
10385 *10*	(1^{+})[a]	O	J^{π}: 1^{+},(2^{-}) In (e,e′).
10394.1 *13*	(10^{+})	C	
10404.8 *7*	(9^{-})	C	
10434 *10*	(2^{+})[a]	O Q	J^{π}: 2^{+},(1^{-}) In (e,e′).
10460 *5*	4^{+}	Q	J^{π}: L(p,p′)=4.
10510 *10*	1^{+}[ag]	O Q	XREF: Q(10492). E(level): possible IAS of 1729,1^{+} In ^{58}Co.
10523 *5*	4^{+}	Q	J^{π}: L(p,p′)=4.
10550 *10*	$(1^{+},2^{-})$[a]	O	
10582 *10*	(1^{+})[a]	O	J^{π}: 1^{+},(2^{-}) In (e,e′).
10586 *5*	3^{-}	Q	J^{π}: L(p,p′)=3.
10590 *50*	0^{+}	L	J^{π}: L(^{3}He,n)=0.
10590.9 *6*	(11^{-})	C	
10630 *40*	4^{+}	W	J^{π}: L(p,t)=4.
10633 *10*	1^{+}[a]	O	
10638 *5*	3^{-}	Q	J^{π}: L(p,p′)=3.
10667 *10*	1^{+}[agh]	O Q	E(level): possible IAS of 1868,1^{+} In ^{58}Co. Configuration=$\nu(f^{-1}_{7/2}f_{5/2})$ ((p,p′),1986Ho15).
10694.7[p] *7*	(10^{-})	C	
10720 *10*	$(3^{-},4^{+})$[a]	O	
10744 *5*	4^{+}	O Q	J^{π}: L(p,p′)=4.
10781.7 *9*	(11^{+})	C	
10805 *10*	$1^{+},2^{-}$[a]	O Q	
10823 *5*	4^{+}	Q	J^{π}: L(p,p′)=4.
10856 *10*	$(1^{-},2^{+})$[a]	O	
10882.0 *14*	(11^{+})	C	
10891 *10*	2^{+}[a]	O	
10902 *5*	4^{+}	Q	J^{π}: L(p,p′)=4.
10950 *10*	1^{+}[a]	O	
10967 *5*	4^{+}	K Q	XREF: K(10950). J^{π}: L(p,p′)=4.
11005.6 *8*	(11^{-})	C	
11008 *10*	1^{+}[ag]	O Q	E(level): possible IAS of 2249,1^{+} In ^{58}Co.
11052 *10*	(1^{+})[g]	O Q	XREF: Q(11063). J^{π}: (2^{+}) In (e,e′).

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
11080 *10*	(1+)[a]	O	Jπ: 1+,(2−) In (e,e′).
11117.0[o] *8*	(11−)	C	
11135 *10*	(3−,4+)[a]	O	
11158 *5*	3−	O Q	E(level): note that 11158 and 11165 are two different levels in (p,p′). Jπ: L(p,p′)=3; 2+,3− In (e,e′).
11165 *10*	1+	Q	Jπ: from 0° data in (p,p′) (2007Fu04) In (p,p′).
11203 *5*	4+	Q	Jπ: L(p,p′)=4.
11240 *25*	8−[a]	O	
11255.2[p] *7*	(11−)	C	
11266 *10*	(1+)[a]	O Q	Jπ: 1+,(2−) In (e,e′).
11297 *10*	2+[a]	O	
11297.7 *7*	(12−)	C	
11300 *5*	4+	Q	Jπ: L(p,p′)=4.
11335 *10*	1−,2+[a]	O Q	
11363 *10*	(2−)[a]	O	Jπ: 2−,(1+) In (e,e′).
11410 *10*	(2+,3−)[a]	O	
11413.1 *9*	(11+)	C	
11434 *5*	4+	Q	Jπ: L(p,p′)=4.
11450 *25*	(6+)[a]	O	
11470 *10*	(2−)[a]	O	Jπ: 2−,(1+) In (e,e′).
11474.5[r] *7*	(12+)	C	
11497 *10*	(3−)	Q W	Jπ: L(p,t)=(3).
11536 *10*	(2−)[a]	O	Jπ: 2−,(1+) In (e,e′).
11579.3 *8*	(12+)	C	
11593 *10*	2+[a]	O Q	
11639 *10*	2+,3−[a]	O	
11678 *10*	1+[ag]	Q	
11728 *5*	4+	Q	Jπ: L(p,p′)=4.
11734 *10*	2+[a]	O	
11792 *10*	(2+)[a]	O Q	
11814.3 *8*	(12−)	C	
11824.7 *11*	(12+)	C	
11850 *40*	(3−)	W	Jπ: L(p,t)=(3).
11860 *10*	1+[a]	O	
11887 *10*	1+[a]	O Q	Jπ: 1+ In (p,p′) (2007Fu04); 2−,(1+) in (e,e′).
11933 *10*	(3−,4+)[a]	O	
11990 *10*	(1+)[a]	O	Jπ: 1+,(2−) In (e,e′).
11996.4[p] *7*	(12−)	C	
12040 *10*	2+[a]	O	
12090 *10*		O	
12141 *10*	1−,2+[a]	O	
12155.1 *10*	(12−)	C	
12197 *10*	(1+,2+)[g]	O Q	Jπ: (2+) In (e,e′).
12249 *10*		O	
12283 *10*	(1)[g]	O Q	Jπ: (1−) In (e,e′).
12330 *10*	(2−)[a]	O	Jπ: 2−,(1+) In (e,e′).
12356.8 *9*	(12−)	C	
12364.6 *7*	(12+)	C	
12386 *10*	(1+)[g]	O Q	Jπ: (2+) In (e,e′).
12447 *10*	(2+)[a]	O	
12482 *10*	(2+,4+)[a]	O	
12500 *25*	8−[a]	O	
12570.1 *7*	(12+)	C	%p=3.7 *14* (2009Jo03) E(p)(c.m.)=1.83 MeV *5* (2009Jo03). prompt p decay populates 2524, 13/2− level In ^{57}Co which deexcites

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
				through 834-466-1224 cascade to ^{57}Co g.s.
12573 *10*	$2^+,3^-$[a]		O	
12613 *10*	2^+[a]		O	
12643 *10*	$(1^+,2^+)$[g]		O Q	J^{π}: $2^+,(4^+)$ In (e,e′).
12700 *10*	(2^-)[a]		O	J^{π}: $2^-,(1^+)$ In (e,e′).
12719.2 *7*	(12^+)		C	
12744 *10*	$(1^+,2^+)$[g]		O Q	J^{π}: (2^+) In (e,e′).
12796 *10*	(1^+)[a]		O	J^{π}: $1^+,(2^-)$ In (e,e′).
12831.6[o] *9*	(13^-)		C	
12837 *10*	(2^+)[a]		O	
12858 *10*	2^+[a]		O	
12912.1[p] *9*	(13^-)		C	
12928 *4*			C	J^{π}: possible γ to (11^+) suggests (11,12,13).
12931 *10*	$2^+,3^-$[a]		O	
12971 *10*	2^+[a]		O	
13016.6 *10*	(13^-)		C	
13022 *10*	$2^+,4^+$[a]		O	
13048.2 *10*	(13^-)		C	
13057 *10*	2^+[a]		O	
13095.1 *19*	(12^+)		C	
13125 *10*			O	
13129.2 *18*	(12^+)		C	
13176 *10*	(1^+)[a]		O	J^{π}: $1^+,(2^-)$ In (e,e′).
13233 *10*	2^+[a]		O	
13238.1 *7*	(13^+)		C	
13260 *10*	2^+[a]		O	
13305 *10*	$(1^+,2^+)$[g]		O Q	J^{π}: (2^+) In (e,e′).
13345 *10*	2^+[a]		O	
13356.6[r] *9*	(13^+)		C	
13411 *10*	1^+[a]		O	
13448 *10*	2^+[a]		O	
13492 *10*			O	
13556 *10*	(2^+)[a]		O	J^{π}: $2^+,(1^-)$ In (e,e′).
13590 *10*	$(1^+,2^-)$[a]		O	
13606.8[w] *13*	(12^+)		C	
13632 *4*			C	J^{π}: γ to (11^+) suggests (11,12,13).
13649 *10*	2^+[a]		O	
13685 *10*	(2^+)[a]		O	
13.7×10^3 *3*		4.7 MeV *3*	O	E(level): GQR.
13716 *10*	1^+[a]		O	
13765 *10*	(1^+)[a]		O	J^{π}: $1^+,(2^-)$ In (e,e′).
13814 *10*	2^+[a]		O	
13850.1[p] *10*	(14^-)		C	
13884.2 *17*	(13^+)		C	
13902 *10*	(2^+)		O	J^{π}: $2^+,(3^-)$ In (e,e′).
13929 *10*	(2^+)[a]		O	
13943 *3*			C	J^{π}: γ to (11^+) suggests (11,12,13).
13955 *10*	(2^+)[a]		O	
14000 *10*	2^+[a]		O	
14045 *10*	(2^+)[a]		O	
14081 *10*	1^+[a]		O	
14127.8 *8*	(14^+)		C	
14138 *10*			O	
14180 *10*	(1^+)[a]		O	J^{π}: $1^+,(2^-)$ In (e,e′).
14213 *10*	(2^+)[a]		O	

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	XREF	Comments
14217.5 *13*	(14$^-$)		C	
14272 *10*	1$^-$,2$^+$,3$^-$[a]		O	
14303 *10*	1$^-$,2$^+$,3$^-$[a]		O	
14337 *10*	2$^+$[a]		O	
14383 *10*	2$^+$[a]		O	
14441 *10*	(2$^+$)[a]		O	J$^{\pi}$: 2$^+$,(3$^-$) In (e,e′).
14455.8[n] *16*	(13$^+$)		C	
14470 *40*	(0$^+$)		W	J$^{\pi}$: L(p,t)=(0).
14504 *10*	2$^+$[a]		O	
14542 *10*	(2$^+$)[a]		O	J$^{\pi}$: 2$^+$,(1$^-$,3$^-$) In (e,e′).
14598 *10*			O	
14630 *10*	2$^+$,3$^-$[a]		O	
14692 *10*			O	
14736 *10*	(2$^+$)[a]		O	
14823 *10*	2$^+$[a]		O	
14852 *10*	(1$^+$)[a]		O	J$^{\pi}$: 1$^+$,(2$^-$) In (e,e′).
14853.1[o] *11*	(15$^-$)		C	
14894 *10*	1$^-$,2$^+$[a]		O	
14920.9[r] *11*	(14$^+$)		C	
14934.7[p] *12*	(15$^-$)		C	
14940 *10*	(2$^+$)[a]		O	
15010.6 *8*	(14$^+$)		C	
15031.0 *10*	(14$^+$)		C	
15105.2 *19*			C	J$^{\pi}$: γ′s to (12$^+$) and (13$^+$) suggest (12,13,14).
15187.0 *23*	(13$^+$)		C	
15241.9 *14*	(13$^-$)		C	%p=43 *6* (2009Jo03) E(p)(c.m.)=2.15 MeV *5* (2009Jo03). prompt p decay populates 4814, 17/2$^-$ level In ^{57}Co which deexcites through 2290-834-466-1224 cascade to ^{57}Co g.s.
15242.0 *18*			C	J$^{\pi}$: γ to (13$^-$) suggests (13,14,15).
15266.3 *10*	(14$^+$)		C	
15294.3[w] *10*	(14$^+$)		C	
15324.1[m] *12*	(14$^+$)		C	
≈15400	(13$^-$)		C	%p=? E(p)(c.m.)≈2.35 MeV (2009Jo03). prompt p decay populates 4814, 17/2$^-$ level In ^{57}Co which deexcites through 2290-834-466-1224 cascade to ^{57}Co g.s.
15412.6 *14*	(13$^-$)		C	J$^{\pi}$: from 2005Ru06.
15434.1 *14*	(13$^-$)		C	
15709.3 *9*	(15$^+$)		C	
15736.9 *8*	(15$^+$)		C	
15858.2 *9*	(15$^+$)		C	
16167.2 *20*			C	J$^{\pi}$: γ′s to (13$^+$) and (14$^+$) suggest (13,14,15).
16171.0[n] *13*	(15$^+$)		C	
16246.6[p] *14*	(16$^-$)		C	
16496.6 *23*	(16$^-$)		C	
16567.0 *9*	(16$^+$)		C	
16.64×10^3 *12*		5.81 MeV +*16*−*11*	T	E(level): L=2, isoscalar giant-quadrupole resonance (ISGQR).
16673 *3*	(14$^-$)		C	%p=?

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
				J^{π}: from 2005Ru06, decays by protons to 5918, 19/2$^-$ level in ^{57}Co; the decay mode not shown in 2009Jo03.
16676.4 *8*	(16$^+$)		C	
16707 *3*	(14$^-$)		C	%p=40 *7* (2009Jo03) E(p)(c.m.)=2.56 MeV *5* (2009Jo03). prompt p decay populates 5918, 19/2$^-$ level In ^{57}Co which deexcites through 1104-2290-834-466-1224 cascade to ^{57}Co g.s.
16745 *3*	(14$^-$)		C	%p=? E(p)(c.m.)=2.61 MeV *12* (2009Jo03). prompt p decay populates 5918, 19/2$^-$ level In ^{57}Co which deexcites through 1104-2290-834-466-1224 cascade to ^{57}Co g.s.
16758 *3*	(14$^-$)		C	%p=41 *6* (2009Jo03) E(p)(c.m.)=2.59 MeV *8* (2009Jo03). prompt p decay populates 5918, 19/2$^-$ level In ^{57}Co which deexcites through 1104-2290-834-466-1224 cascade to ^{57}Co g.s.
16798.0[v] *10*	(15$^-$)	17 ps *11*	C	%p=7 *2* (2009Jo03); %α=2.6 *3* (2009Jo03) $T_{1/2}$: from estimated $T_{1/2}$=7-28 ps (2001Ru03) from average Q(transition) in the band=2.4 *3*, assuming that 1364γ and 1385γ are part of the continuation of the band and that Q(transition) does not change at lower spins. E(p)(c.m.)=1.62 MeV *6*, E(α)(c.m.)=6.90 MeV *6* (2009Jo03). prompt p decay populates 6976, 21/2$^-$ level In ^{57}Co which deexcites through 1058-1104-2290-834-466-1224 cascade to ^{57}Co g.s. prompt α decay populates 2949, 6$^+$ level In ^{54}Fe which deexcites through 411(6$^+$ to 4$^+$)−1130(4$^+$ to 2$^+$)−1408(2$^+$ to g.s.) cascade.
17019.6[o] *19*			C	J^{π}: γ to (15$^-$) suggests (15,16,17), (17$^-$) from possible band assignment.
17163.1[m] *13*	(16$^+$)		C	
17197 *3*			C	
17290.0[w] *11*	(16$^+$)		C	
17.42×10^3 *25*		3.9 MeV *4*	O T	E(level): L=1, giant-dipole resonance. Γ is from (α,α'). Other: 5.0 MeV *3* In (e,e′).
17482 *3*	(15$^-$)		C	%p=11 *3* (2009Jo03) E(p)(c.m.)=2.35 MeV *6* (2009Jo03). prompt p decay populates 6976, 21/2$^-$ level In ^{57}Co which deexcites through 1058-1104-2290-834-466-1224 cascade to ^{57}Co g.s.
17530.0 *9*	(17$^+$)		C	
17582 *3*	(15$^-$)		C	%p=66 *5* (2009Jo03); %α<10 (2009Jo03) E(p)(c.m.)=2.43 MeV *4*, E(α)(c.m.)=7.71 MeV *8* (2009Jo03). prompt p decay populates 6976, 21/2$^-$ level In ^{57}Co which deexcites through 1058-1104-2290-834-466-1224 cascade to ^{57}Co g.s. prompt α decay populates 2949, 6$^+$ level In ^{54}Fe which deexcites through 411(6$^+$ to 4$^+$)−1130(4$^+$ to 2$^+$)−1408(2$^+$ to g.s.) cascade.

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
17607 *3*	(15⁻)		C	%p=43 *4* (2009Jo03) E(p)(c.m.)=2.47 MeV *7* (2009Jo03). prompt p decay populates 6976, 21/2⁻ level In ^{57}Co which deexcites through 1058-1104-2290-834-466-1224 cascade to ^{57}Co g.s.
17681.4 *9*	(17⁺)		C	
18261.1[n] *14*	(17⁺)		C	
18341.5[j] *24*	(16⁻)		C	
18.43×10³ *15*		7.41 MeV *13*	T	E(level): L=0, giant-monopole resonance.
18461.0[v] *12*	(17⁻)		C	
18638.9[s] *10*	(18⁺)		C	
19196[p] *4*			C	Jπ: γ to (16⁻) suggests (16,17,18), (18⁻) from possible band assignment.
19205.4[k] *25*	(17⁻)		C	
19482.5[m] *16*	(18⁺)		C	
19566.9[w] *19*	(18⁺)		C	
19945.7[t] *11*	(19⁺)		C	
20135.4[j] *25*	(18⁻)		C	%p<10 (2009Jo03) E(p)(c.m.)=1.94 MeV *7* (2009Jo03). prompt p decay populates 10075, 25/2⁺ level In ^{57}Co.
20450.1[v] *18*	(19⁻)		C	
20826.2[n] *23*	(19⁺)		C	
21106.3[k] *25*	(19⁻)		C	%p<10 (2009Jo03) E(p)(c.m.)=1.89 MeV *7* (2009Jo03). prompt p decay populates 11069, 27/2⁺ level In ^{57}Co.
21248.0[s] *13*	(20⁺)		C	
22138[w] *3*	(20⁺)		C	
22211.3[j] *25*	(20⁻)		C	
22239.6[m] *25*	(20⁺)		C	
22767.9[t] *15*	(21⁺)		C	
22800.4[v] *22*	(21⁻)		C	
23331[k] *3*	(21⁻)		C	
23741[n] *4*	(21⁺)		C	
24.03×10³ *19*		4.3 MeV *26*	T	E(level): isoscalar giant-dipole resonance (ISGDR).
24211.9[s] *17*	(22⁺)		C	
24611[j] *3*	(22⁻)		C	
25141[w] *4*	(22⁺)		C	
25552[v] *3*	(23⁻)		C	
25918[k] *3*	(23⁻)		C	
26059.7[t] *20*	(23⁺)		C	
27366[j] *4*	(24⁻)		C	
28709[v] *3*	(25⁻)		C	
28931[k] *3*	(25⁻)		C	
30491[j] *4*	(26⁻)		C	
31.13×10³ *14*		7.8 MeV *27*	O T	E(level): isoscalar giant-dipole resonance (ISGDR). In (e,e′), composite energy is 28.3 MeV *3*.
32175 *3*	(27⁻)		C	
32495[k] *3*	(27⁻)		C	

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
33972[j] *4*	(28^-)	C	
36045 *4*	(29^-)	C	
36535[k] *3*	(29^-)	C	
37810[j] *4*	(30^-)	C	
40333 *4*	(31^-)	C	
40931[k] *3*	(31^-)	C	
42007[j] *4*	(32^-)	C	
x[u]		C	Additional information 2.
2868.1+x[u] *10*		C	
6083.2+x[u] *15*		C	
9667.3+x[u] *18*		C	

[†] From a least-squares fit to Eγ's for levels populated in γ-ray studies. For levels populated in particle-transfer and inelastic scattering studies, the values are averaged over all available data. For levels populated in (γ,γ′), values are as given in the ^{58}Ni(γ,γ′) dataset.

[‡] For high-spin (J>6) levels, all assignments are from γ-ray cascades observed in in-beam γ-ray studies: ^{28}Si(^{36}Ar,α2pγ),^{28}Si(^{32}S,2pγ); ^{40}Ca(^{24}Mg,α2pγ); ^{45}Sc(^{16}O,p2nγ); ^{48}Ti(^{12}C,2nγ) and ^{56}Fe(α,2nγ). For many transitions angular distribution/correlation data support these assignments. For a few transitions, supporting γ(lin pol) data are available. In addition, ascending spins are assumed in these reactions as the excitation energy rises. Arguments for individual are given for levels below 10 MeV. Above this energy, all assignments are as proposed in ^{28}Si(^{36}Ar,α2pγ) reaction by 2009Jo03 and their previous papers, based on DCO data for selected transitions and γ cascades. The parentheses have been added by the evaluators since strong supporting arguments from polarization or other parity-sensitive seem to be lacking. When J^{π} is deduced from L-transfers, target $J^{\pi}=0^+$ in all reactions.

[#] From DSA in (p,p′γ) (1969Be48), except where noted otherwise. Weighted or unweighted averages are taken when values are available from different reactions. Values from (γ,γ′) are deduced from measured Γ_0^2/Γ and branching ratios.

[@] From Γ_0^2/Γ or Γ_0 in (γ,γ′) and adopted branching ratios, assuming Γ(0)/Γ=1 when there is only the ground-state transition listed from a level. See (γ,γ′) dataset for details.

[&] A level assumed by the evaluators to assign γ transitions to 1454 and g.s. in (p,p′γ). These transitions could not be assigned to levels in (p,p′) because their J^{π} was 3^- or 4^+.

[a] From analysis of form factor in (e,e′).

[b] (0^+) from L(p,t)=(0) for 5960 *40*.

[c] (4^+) from L(p,t)=(4) for 6560 *40*.

[d] $(2^+,3^-)$ from L(^{3}He,n)=(2,3) for 6900 *50*.

[e] 4^+ from (e,e′) for 6930 *15*.

[f] 3^- from L(^{3}He,^{3}He′)=3 for 6780 *25*.

[g] (1^+) from strong population of L(p,p′)=0 state in near 0° data (2007Fu04), and interpretation as GT transition.

[h] From analysis of σ(θ) and analyzing power data in (pol,P′).

[i] From γ(θ) and/or asymmetry measurement In (pol γ,γ′).

[j] Band(A): Band based on (16^-), α=0. Parity from 2009Jo03 and 2006Ru02.

[k] Band(a): Band based on (17^-), α=1. Parity from 2009Jo03 and 2006Ru02.

[l] Band(B): yrast structure.

[m] Band(C): Band based on 15323,14^+.

[n] Band(D): Band based on 14455,13^+.

[o] Band(E): Band based on 9585,9^-.

[p] Band(F): ΔJ=1 band based on 10694,10^-.

[q] Band(G): ΔJ=1 band based on 3422,3^+.

[r] Band(H): ΔJ=1 band based on 7724,8^+.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

[s] Band(I): Band based on 18638,18^+.
[t] Band(i): Band based on 19945,19^+.
[u] Band(J): γ cascade.
[v] Band(K): SD-1 Band. BASED ON (15^-); from 2009Jo03, 2006Ru02 and 2001Ru03. this band has been assigned (2001Ru03) In the secondary minimum of the potential well. Population intensity≈2%, relative to the total ^{58}Ni channel. The (13^-) states At 15410 and 15431 are possibly continuation of this band towards low-lying states. The (15^-) member of this band decays by prompt α emission to ^{54}Fe. Average Q(transition)=2.4 *3* (2001Ru03), from residual Doppler-shift method.
[w] Band(L): SD-2 band. based on (12^+); from 2009Jo03 and 2001Ru03. this band has been assigned (2001Ru03) In the secondary minimum of the potential well. Population intensity≈1%, relative to the total ^{58}Ni channel.

$\gamma(^{58}Ni)$

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡]	E_f	J^π_f	Mult.[†]	δ[†]	α[#]	$I_{(\gamma+ce)}$	Comments
1454.21	2^+	1454.28 *10*	100	0.0	0^+	E2				B(E2)(W.u.)=10.0 *4*
2459.21	4^+	1004.80 *15*	100	1454.21	2^+	E2				B(E2)(W.u.)=11.2 *12*
		2459.1	≤0.5	0.0	0^+					
2775.42	2^+	316.1	≤0.06	2459.21	4^+					
		1321.2 *2*	100.0 *3*	1454.21	2^+	E2+M1	−1.1 *1*			B(M1)(W.u.)=0.011 *+3−4*; B(E2)(W.u.)=15 *+4−5* Mult.: large δ(Q+D) from $\gamma(\theta)$.
		2775.5 *4*	4.5 *3*	0.0	0^+	E2				B(E2)(W.u.)=0.029 *+8−10*
2902.15	1^+	442.7	≤0.15	2459.21	4^+					
		1448.2 *4*	100.0 *6*	1454.21	2^+					
		2901.3 *5*	6.4 *6*	0.0	0^+	(M1)				B(M1)(W.u.)=0.00079 *+18−19* Mult.: $\Delta J=1$, dipole from $\gamma(\theta)$; ΔJ^π requires M1.
2942.56	0^+	40.3 *4*	100 *4*	2902.15	1^+	[M1]		0.581 *19*		α(K)= 0.519 *17*; α(L)= 0.0541 *18*; α(M)=0.000762 *25* B(M1)(W.u.)=0.116 *14*
		167.2 *2*	18.4 *19*	2775.42	2^+	[E2]		0.0809		α(K)= 0.0722; α(L)=0.00761; α(M)=0.001063 B(E2)(W.u.)=21 *3*
		483.3[a]	≤0.4	2459.21	4^+					
		1488.3 *3*	19.9 *19*	1454.21	2^+	[E2]				B(E2)(W.u.)=0.00040 *6*
		2942.3		0.0	0^+	E0			0.058 *8*	q^2_k(E0/E2)=0.65 *10*, X(E0/E2)=0.53 *9*, ρ^2(E0)=0.63E−5 *10* (2005Ki02 evaluation). $I_{(\gamma+ce)}$: 0.021% 3 decay of level In (p,p′γ).
3037.86	2^+	95.2	≤0.5	2942.56	0^+					
		135.8	≤0.2	2902.15	1^+					
		262.6 *3*	1.7 *3*	2775.42	2^+	M1(+E2)	−0.03 *5*			B(M1)(W.u.)=0.21 *5*; B(E2)(W.u.)=5 *+18−5* If M1, B(M1)(W.u.)=0.3 *1*.
		578.5	≤0.5	2459.21	4^+					
		1583.8 *3*	100.0 *17*	1454.21	2^+	M1+E2	+0.21 *3*			B(M1)(W.u.)=0.055 *8*; B(E2)(W.u.)=1.8 *6*
		3037.7 *3*	68.4 *19*	0.0	0^+	[E2]				B(E2)(W.u.)=1.15 *17*
3263.66	2^+	321	≤0.3	2942.56	0^+					
		361.6	≤0.3	2902.15	1^+					
		488.2	≤0.3	2775.42	2^+					
		804.3	≤1.7	2459.21	4^+					
		1809.5 *3*	65.8 *18*	1454.21	2^+	M1+E2	+0.7 *4*			B(M1)(W.u.)=0.027 *11*; B(E2)(W.u.)=8 *6*
		3263.4 *4*	100.0 *18*	0.0	0^+	[E2]				B(E2)(W.u.)=1.9 *3*
3269.1	(2)	3269.1 *8*		0.0	0^+					
3273.7	(2)	3273.7 *7*		0.0	0^+					
3420.55	3^+	382.9 *3*	5.7 *3*	3037.86	2^+	(M1(+E2))	+0.08 *9*			B(M1)(W.u.)=(0.08 *+3−7*); B(E2)(W.u.)=(7 *+15−7*)
		477.9	≤0.6	2942.56	0^+					
		518.5	≤0.7	2902.15	1^+					
		645.1	≤1.2	2775.42	2^+					
		961.0 *2*	100.0 *3*	2459.21	4^+	(M1(+E2))	−0.02 *3*			B(M1)(W.u.)=(0.09 *+4−8*); B(E2)(W.u.)=(0.07 *+23−7*)
		1966.3	≤2.1	1454.21	2^+					
		3420.3	≤0.4	0.0	0^+					
3450.9		3450.9 *5*		0.0	0^+					

$\gamma(^{58}Ni)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[†]	δ[†]	$I_{(\gamma+ce)}$	Comments
3531.1	0^+	493.3	≤1.0	3037.86	2^+				
		588.5[a]		2942.56	0^+				I_γ: ≤1.0, but no γ expected for E0 transition.
		629.1	≤1.1	2902.15	1^+				
		755.7	≤1.8	2775.42	2^+				
		1071.8[a]	≤2.9	2459.21	4^+				
		2076.9 *3*	100	1454.21	2^+	[E2]			B(E2)(W.u.)=5.6 *18*
		3530.9		0.0	0^+	E0		0.068 *11*	q_k^2(E0/E2)=0.27 *4*, X(E0/E2)=0.47 *7*, ρ^2(E0)=0.08 *3* (2005Ki02 evaluation).
3593.71	$1,2^+$	330.0	≤1.1	3263.66	2^+				
		555.8	≤2.4	3037.86	2^+				
		652.8 *10*	8.3 *10*	2942.56	0^+				
		691.6	<1.5	2902.15	1^+				
		818.4 *4*	27.2 *15*	2775.42	2^+				
		1134.3	≤3.5	2459.21	4^+				
		2139.2 *5*	18.0 *10*	1454.21	2^+				
		3593.3 *6*	100.0 *22*	0.0	0^+				I_γ: other: branching=24% 3 in (γ,γ') work of 2000Ba63 seems in error, the level in (γ,γ') is considered as the same as in other reactions and decays.
3620.09	4^+	582.4	<3.8	3037.86	2^+				
		844.8	<3.8	2775.42	2^+				
		1161.2 *3*	100.0 *24*	2459.21	4^+	(M1(+E2))	+0.6 *+3−6*		B(M1)(W.u.)=(0.07 *+4−6*); B(E2)(W.u.)=(4.E+1 *4*)
		2166.3 *5*	20.5 *24*	1454.21	2^+	E2			B(E2)(W.u.)=1.3 *+7−10*
		3620.0[a]	<4.4	0.0	0^+				
3775.0	3^+	354.5 *3*	33 *3*	3420.55	3^+	(M1(+E2))	+0.05 *+21−12*		B(M1)(W.u.)=(0.33 *+9−17*); B(E2)(W.u.)=(1.E+1 *+11−1*)
		736 *2*	16 *3*	3037.86	2^+				If M1, B(M1)(W.u.)=0.019 *9*.
		872.6	<4.3	2902.15	1^+				
		999.2		2775.42	2^+				
		1316.4 *15*	100 *7*	2459.21	4^+	M1(+E2)	+0.19 *15*		B(M1)(W.u.)=(0.019 *+5−10*); B(E2)(W.u.)=(0.8 *+12−8*)
		2320.5 *8*	24 *3*	1454.21	2^+				If M1, B(M1)(W.u.)=9×10^{-4} *5*.
		3774.4	<5	0.0	0^+				
3898.8	2^+	2444.7 *4*	100.0 *16*	1454.21	2^+	[M1]			B(M1)(W.u.)=0.050 *13*
		3898.0 *7*	31.9 *16*	0.0	0^+	[E2]			B(E2)(W.u.)=0.50 *14* I_γ: from $(p,p'\gamma)$.
3943.6		3943.6 *12*		0.0	0^+				
4105.9	(4^+)	486.0 *3*	6 *3*	3620.09	4^+				
		683.7 *5*	3 *3*	3420.55	3^+				
		1646.4 *12*	9 *3*	2459.21	4^+				
		2653.1 *12*	100 *3*	1454.21	2^+	(Q)			
4108.4	2^+	687.4	4.3 *22*	3420.55	3^+				
		1205.9	11 *4*	2902.15	1^+				
		1332.5	13 *4*	2775.42	2^+	[M1]			B(M1)(W.u.)=0.0044 *24*
		2654.6 *4*	87 *5*	1454.21	2^+	M1+E2	−0.58 *+8−9*		B(M1)(W.u.)=0.0028 *13*; B(E2)(W.u.)=0.26 *13*
		4107.4 *7*	100 *5*	0.0	0^+	[E2]			B(E2)(W.u.)=0.13 *6*

$^{58}_{28}Ni_{30}$-18

Adopted Levels, Gammas (continued)

$\gamma(^{58}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡]	E_f	J^π_f	Mult.[†]	δ[†]	Comments
4294.7	4^+	1835.3 *4*	67 *33*	2459.21	4^+			
		2840.8 *10*	100 *33*	1454.21	2^+	[E2]		B(E2)(W.u.)=6 +*5*−*6*
4347.9		2893.6 *12*	100	1454.21	2^+			if E2, B(E2)(W.u.)=12 *11*.
4358.7	$(2^+,3,4^+)$	1584		2775.42	2^+			
		1901.7 *12*		2459.21	4^+			
		2902		1454.21	2^+			
4383.0	(5^+)	276.7 *6*	3.8 *7*	4105.9	(4^+)	D+Q		
		763.0 *3*	100.0 *20*	3620.09	4^+	(M1+E2)	−0.38 *5*	
		962 *1*	0.2 *2*	3420.55	3^+			
		1923.9 *7*	31.2 *20*	2459.21	4^+	D+Q	+0.27 *10*	
4404.3	4^+	2951.3 *11*	100	1454.21	2^+	E2		B(E2)(W.u.)=4.4 +*15*−*18*
4449.6	$1^+,2^+$	855.0 *4*	100 *10*	3593.71	$1,2^+$			
		1547.0 *7*	11 *3*	2902.15	1^+			
		1673.8 *6*	12.4 *17*	2775.42	2^+			
4474.6	3^-	1697.5 *9*	25 *8*	2775.42	2^+	[E1]		B(E1)(W.u.)=0.0008 *4*
		3021.1 *6*	100 *17*	1454.21	2^+	[E1]		B(E1)(W.u.)=0.00060 *22*
4518.3		2059		2459.21	4^+			
		3064		1454.21	2^+			
4538.0	0^+	3083.7 *6*	100	1454.21	2^+	[E2]		B(E2)(W.u.)=4.9 *18*
4574.1	1	4574.1[@a]		0.0	0^+			
4752.2	4^+	1132	100	3620.09	4^+			
		2293	25	2459.21	4^+			
4920.0		1300		3620.09	4^+			
		1656		3263.66	2^+			
		2461		2459.21	4^+			
4954.0	1	4954.0 *8*		0.0	0^+			
4964.7	(5^+)	1344.7 *2*	23 *3*	3620.09	4^+			
		2503.8 *13*	100 *3*	2459.21	4^+	D+Q	−0.42 *4*	
5064.3		2605	100	2459.21	4^+			
5127.5	6^+	723.2 *2*	0.6 *2*	4404.3	4^+			
		744.6 *3*	100.0 *21*	4383.0	(5^+)	(M1+E2)	−0.42 *4*	δ: from (^{36}Ar,α2pγ). Other: −2.5 +*6*−*8* or −0.20 +*10*−*15* in (^{12}C,2nγ).
		832.0[a] *7*	0.4 *2*	4294.7	4^+			
		1020.3 *7*	1.46 *21*	4105.9	(4^+)			
		2668.6 *10*	45.8 *21*	2459.21	4^+	Q		
5170.3		2711		2459.21	4^+			
5359.3?	(2)	5359.3[@a] *16*		0.0	0^+			
5384.5	6^+	1000.8 *8*	100 *10*	4383.0	(5^+)	D+Q		
		1088.9 *10*	4 *2*	4294.7	4^+			
		1764.5 *11*	100 *10*	3620.09	4^+	Q		
		2926.6 *15*	66 *8*	2459.21	4^+	Q		
5394.0		5394.0 *9*		0.0	0^+			
5436.3	4^+	2977	100	2459.21	4^+			
5452.2	1	5452.2[@] *4*		0.0	0^+			

γ(^{58}Ni) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡]	E_f	J^π_f	Mult.[†]	δ[†]	Comments
5472.3	4+	3013		2459.21	4+			
		4018		1454.21	2+			
5503.5		2728	100	2775.42	2+			
5528.0	(1)	5528.0 *4*		0.0	0+			
5589.0	(5−)	3129.0 *15*	100	2459.21	4+			
5590.3	2+	5590	100	0.0	0+			E_γ: from (p,p′γ).
5594.2	4+	1819	53	3775.0	3+			E_γ: all γ′s from (p,p′γ).
		3135	100	2459.21	4+			
		4140	3	1454.21	2+			
5706.3		2931[a]		2775.42	2+			
		3247		2459.21	4+			
		4252		1454.21	2+			
5744.7	(6+)	3286.0 *18*	100	2459.21	4+	Q		
5748.5	2+	2155		3593.71	1,2+			
		3289		2459.21	4+			
		4294[a]		1454.21	2+			
5766.3	4+	3307		2459.21	4+			
		4312		1454.21	2+			
5803.3		4349		1454.21	2+			
		5803		0.0	0+			
5824.6		2404		3420.55	3+			
5896.4		4442		1454.21	2+			
		5896		0.0	0+			
5905.3	1+	5905.3 *7*		0.0	0+	M1		B(M1)(W.u.)=0.0043 *7*
5942.4	(0+)	4488	100	1454.21	2+			
6018.4	3−	4564	100	1454.21	2+			
6027.3	1−	3565		2459.21	4+			
		4574.1[@] *5*	23 *4*	1454.21	2+			
		6027.3 *7*	100 *4*	0.0	0+	E1		B(E1)(W.u.)=0.00197 *17*
6067.5	(7+)	322.8 *2*	1.6 *3*	5744.7	(6+)	(M1+E2)	−0.18 *10*	
		682.7 *5*	16.1 *13*	5384.5	6+	(M1+E2)	−0.11 *8*	
		940.1 *4*	100 *5*	5127.5	6+	(M1+E2)	−0.36 *4*	
		1684.6 *10*	42 *3*	4383.0	(5+)	Q		
6084.7	7−	495.6 *6*	2.4 *12*	5589.0	(5−)			
		699.6 *8*	23.5 *24*	5384.5	6+	E1(+M2)	−0.06 *13*	
		957.1 *7*	100 *4*	5127.5	6+	E1(+M2)	−0.06 *5*	
		3625.1 *13*	10.6 *12*	2459.21	4+	(E3)		Mult.: DCO In (^{36}Ar,α2pγ) consistent with pure octupole or ΔJ=2,Q, not with ΔJ=1, dipole.
6174.3	2+,3−	3715		2459.21	4+			
		4720[a]		1454.21	2+			
		6174		0.0	0+			
6220.0	(7+)	835.5 *6*	100 *9*	5384.5	6+	D+Q	−0.08 *4*	
		1092.7 *5*	88 *9*	5127.5	6+	D+Q		

$^{58}_{28}$Ni$_{30}$-20

γ(^{58}Ni) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡]	E_f	J^π_f	Mult.[†]	δ[†]	Comments
6220.0	(7$^+$)	1256.4 *9*	40 *3*	4964.7	(5$^+$)	(Q)		
6228.3	(2$^+$)	3326		2902.15	1$^+$			
		4774		1454.21	2$^+$			
		6228		0.0	0$^+$			
6274.3	4[+]	3815	100	2459.21	4$^+$			
6308.5	3$^-$	3366		2942.56	0$^+$			
		3533		2775.42	2$^+$			
		4854		1454.21	2$^+$			
6360.6		2940	100	3420.55	3$^+$			
6402.4		6402	100	0.0	0$^+$			
6424.9?	1	6424.9[@a] *9*		0.0	0$^+$			
6430.7?	1	6430.7[a] *10*		0.0	0$^+$			
6468.4	(1$^+$)	5014		1454.21	2$^+$			
		6468		0.0	0$^+$			
6478.4	2$^+$	5024		1454.21	2$^+$			
		6478		0.0	0$^+$			
6507.2		2887	100	3620.09	4$^+$			
6571.4	2$^+$	5117	100	1454.21	2$^+$			
6601.3		2981		3620.09	4$^+$			
		4142		2459.21	4$^+$			
6604.6	(8$^+$)	384.8 *3*	2.6 *3*	6220.0	(7$^+$)			
		519.5 *4*	2.1 *3*	6084.7	7$^-$			
		537.0 *3*	100 *3*	6067.5	(7$^+$)	(M1+E2)	−0.18 *3*	δ: from (^{36}Ar,α2pγ). Other: −0.20 *+5−9* In (^{12}C,2nγ).
		1476.8 *10*	70 *3*	5127.5	6$^+$	Q		
6665.4		5211		1454.21	2$^+$			
		6665		0.0	0$^+$			
6685.0?	1	6685.0[@a] *9*		0.0	0$^+$			
6717.4		5263		1454.21	2$^+$			
		6717		0.0	0$^+$			
6763.5	3$^-$	5309	100	1454.21	2$^+$			
6805.5	3$^-$	5351	100	1454.21	2$^+$			
6845.7	(7$^+$)	1718.0 *10*	50 *50*	5127.5	6$^+$			
		2463.0 *19*	100 *50*	4383.0	(5$^+$)			
6854.5	3$^-$	5400	100	1454.21	2$^+$			
6863.1	(6)	2478.9 *18*	100	4383.0	(5$^+$)	D		
6892.9?	(1)	6892.9[@a] *15*		0.0	0$^+$			
6992.5		5538	100	1454.21	2$^+$			
7048.2	1$^-$	7048.2 *9*		0.0	0$^+$	E1		B(E1)(W.u.)=0.00155 *6*
7054.5		7054	100	0.0	0$^+$			
7113.5	(1,2$^+$)	5659		1454.21	2$^+$			
		7113		0.0	0$^+$			
7131.5		7131	100	0.0	0$^+$			
7210.4	3$^-$	4751	100	2459.21	4$^+$			

$^{58}_{28}$Ni$_{30}$-21

$\gamma(^{58}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡]	E_f	J^π_f	Mult.[†]	δ[†]	Comments
7249.6	(1)	7249.6 *11*		0.0	0^+			
7271.7	1	5817		1454.21	2^+			E_γ: from (p,p′γ).
		7271.7 *7*		0.0	0^+			
7273.7	7^-	410.5 *3*	8.5 *21*	6863.1	(6)			
		1189.9 *8*	57 *4*	6084.7	7^-	D+Q		
		2146.4 *15*	100 *6*	5127.5	6^+	E1+M2	−0.19 *6*	
7300.5	3^-	5846	100	1454.21	2^+			
7314.8	(8^+)	709.7 *5*	48 *4*	6604.6	(8^+)			
		1095.7 *9*	78 *7*	6220.0	(7^+)			
		1245.9 *9*	100 *7*	6067.5	(7^+)	D+Q	−0.15 *5*	
		1930.3 *14*	81 *7*	5384.5	6^+	Q		
7380.5	$(1,2^+)$	7380	100	0.0	0^+			
7388.8	1^+	7388.8 *4*		0.0	0^+	M1		B(M1)(W.u.)=0.055 *3*
7446.2	(9^+)	841.6 *4*	100 *3*	6604.6	(8^+)	(M1+E2)	−0.18 *3*	
		1226.1 *9*	14.1 *17*	6220.0	(7^+)	Q		
		1378.6 *10*	5.5 *3*	6067.5	(7^+)			
7514.5	3^-	6060	100	1454.21	2^+			
7570.5	2^+	7570	100	0.0	0^+			
7585.1		7585.1 *6*		0.0	0^+			
7595.9	(2)	7595.9 *6*		0.0	0^+			
7616.0?	(1)	7616.0[a] *10*		0.0	0^+			
7680.6	1^-	6226	100	1454.21	2^+			
7709.7	1^+	7709.7 *6*		0.0	0^+	M1		B(M1)(W.u.)=0.067 *3*
7724.3	(8^+)	878.4 *9*	50 *17*	6845.7	(7^+)			
		1119.6 *4*	100 *17*	6604.6	(8^+)	D+Q		
		1639.0 *10*	50 *17*	6084.7	7^-			
		1657.0 *10*	50 *17*	6067.5	(7^+)			
		2343.0 *20*	67 *17*	5384.5	6^+	Q		
7766.0	(1)	7766.0 *7*		0.0	0^+			
7807.3	1^-	6356		1454.21	2^+			
		7807.3 *5*	100	0.0	0^+	E1		B(E1)(W.u.)=0.00117 *15*
7862.6	$(1,2^+)$	6408		1454.21	2^+			
		7862		0.0	0^+			
7876.7	1	6424.9[@] *9*	45 *36*	1454.21	2^+			
		7876.7 *26*	100 *36*	0.0	0^+			
7973.6	(8^+)	1370.0 *10*	100 *5*	6604.6	(8^+)			
		1752.0 *11*	76 *10*	6220.0	(7^+)	D+Q	−0.37 *8*	
		2229.6 *16*	43 *5*	5744.7	(6^+)	Q		
7982.8	(8^-)	709.2 *5*	100 *4*	7273.7	7^-	(M1+E2)	−0.15 *3*	
		1120.2 *8*	6.5 *22*	6863.1	(6)			
		1915.6 *13*	65.2 *22*	6067.5	(7^+)	D+Q	−0.17 *6*	
8068.6?	(1^-)	8068.6[@a] *12*		0.0	0^+	(E1)		B(E1)(W.u.)=0.00062 *8*
8074.5	(8^+)	1470 *1*	55 *5*	6604.6	(8^+)			

$^{58}_{28}Ni_{30}$-22

$\gamma(^{58}$Ni) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$‡	I$_\gamma$‡	E$_f$	J$^\pi_f$	Mult.†	δ†	Comments
8074.5	(8$^+$)	1854.3 *13*	100 *5*	6220.0	(7$^+$)	D+Q	−0.21 *8*	
8096.3	1	8096.3 *6*		0.0	0$^+$			
8110.6	(1,2$^+$)	8110	100	0.0	0$^+$			
8115.1	(8$^-$)	2031.0 *14*	100	6084.7	7$^-$			
8120.8	(9$^+$)	396.5 *1*	6.4 *9*	7724.3	(8$^+$)	D+Q		
		805.5 *5*	6.4 *9*	7314.8	(8$^+$)	D+Q		
		1516.6 *7*	100 *5*	6604.6	(8$^+$)	D+Q	−0.13 *4*	
8237.3	1$^-$	8237.3 *4*		0.0	0$^+$	E1		B(E1)(W.u.)=0.0054 +*8*−*11*
8317.1	1	8317.1 *17*		0.0	0$^+$			
8395.1	1$^-$	5359.3@ *16*		3037.86	2$^+$			I$_\gamma$: 35 *16* for 5359.3γ+5452.2γ, assuming the main placements of these γ rays are from 8395 level.
		5452.2@ *4*		2942.56	0$^+$			
		8395.1 *12*	100 *16*	0.0	0$^+$	E1		B(E1)(W.u.)=0.0019 *6*
8461.0	1$^+$	8461.0 *7*		0.0	0$^+$	M1		B(M1)(W.u.)=0.071 *5*
8514.1	1$^-$	8514.1 *4*		0.0	0$^+$	E1		B(E1)(W.u.)=0.00111 *9*
8552.7	1$^{(+)}$	8552.7 *13*		0.0	0$^+$	[M1]		B(M1)(W.u.)=0.036 *3*
8600.5	1$^+$	8600.5 *7*		0.0	0$^+$	M1		B(M1)(W.u.)=0.061 *7*
8679.3	1$^+$	8679.3 *8*		0.0	0$^+$	M1		B(M1)(W.u.)=0.151 *8*
8718.1	(9$^-$)	603.0 *4*	4.4 *11*	8115.1	(8$^-$)	D+Q		
		735.4 *5*	51.6 *22*	7982.8	(8$^-$)	(M1+E2)	−0.16 *3*	
		1403.2 *10*	20.9 *22*	7314.8	(8$^+$)	D+Q	−0.13 *10*	
		1444.4 *10*	23.1 *11*	7273.7	7$^-$			
		2114.0 *15*	100 *3*	6604.6	(8$^+$)	D(+Q)	−0.03 *4*	
8857.4	1$^{(+)}$	8857.4 *6*	100	0.0	0$^+$	[M1]		B(M1)(W.u.)=0.052 *11*
8880.2	1$^-$	8880.2 *6*		0.0	0$^+$	E1		B(E1)(W.u.)=0.00165 *8*
8896.4?		1581.6 *11*	100	7314.8	(8$^+$)			
8934.6	1$^{(-)}$	8934.6 *5*		0.0	0$^+$	(E1)		B(E1)(W.u.)=0.00204 *8*
8961.3	1$^+$	8961.3 *7*	100	0.0	0$^+$	[M1]		B(M1)(W.u.)=0.026 *3*
9027.2	(9$^-$)	912.3 *6*	17 *6*	8115.1	(8$^-$)			
		2942.2 *21*	100 *6*	6084.7	7$^-$	Q		
9062.7	(10$^+$)	941.1 *7*	100 *4*	8120.8	(9$^+$)	M1+E2	−0.24 *6*	
		1336.5 *28*	4.3 *14*	7724.3	(8$^+$)			
		1617.0 *11*	14.3 *14*	7446.2	(9$^+$)			
		2459.9 *17*	40 *3*	6604.6	(8$^+$)	Q		
9073.4	1$^+$	9073.4 *6*		0.0	0$^+$	(M1)		B(M1)(W.u.)=0.058 *4*
9156.9	1$^+$	9156.9 *7*		0.0	0$^+$	M1		B(M1)(W.u.)=0.037 *5*
9190.7	1$^-$	9190.7 *5*		0.0	0$^+$	E1		B(E1)(W.u.)=0.00100 *11*
9322.1	(11$^+$)	1876.4 *13*	100	7446.2	(9$^+$)	Q		
9326.4	1	6424.9@ *9*	39 *10*	2902.15	1$^+$			
		9326.4 *8*	100 *10*	0.0	0$^+$			
9345.5	(10$^-$)	627.5 *5*	100 *4*	8718.1	(9$^-$)	(M1+E2)	−0.15 *3*	
		1363.1 *10*	22.7 *14*	7982.8	(8$^-$)	Q		

$^{58}_{28}$Ni$_{30}$-23

Adopted Levels, Gammas (continued)

$\gamma(^{58}Ni)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ‡	E_f	J^π_f	Mult.†	δ†	Comments
9345.5	(10⁻)	1899.9 *13*	74 *4*	7446.2	(9⁺)	D+Q	−0.16 *3*	
9368.5	1⁽⁺⁾	9368.5 *6*		0.0	0⁺	[M1]		B(M1)(W.u.)=0.072 *8* if E1, B(E1)(W.u.)=0.00148 *16*.
9455.4	1	9455.4 *18*		0.0	0⁺			
9523.3	1⁻	8068.6@ *12*	72 *9*	1454.21	2⁺			
		9523.3 *13*	100 *9*	0.0	0⁺	E1		B(E1)(W.u.)=0.0026 *5*
9554.0	1	9554.0 *21*		0.0	0⁺			
9585.2	(9⁻)	1511.5 *11*	67 *17*	8074.5	(8⁺)	D		
		1610.6 *11*	100 *17*	7973.6	(8⁺)	D		
		3498.7 *24*	67 *17*	6084.7	7⁻	Q		
9630.5	1	9630.5 *24*		0.0	0⁺			I_γ: branching=38% 6 in (γ,γ'), but other two transitions proposed to feed levels for which there is not much evidence from other studies.
9666.9	(10⁺)	1592.2 *11*	53 *6*	8074.5	(8⁺)			
		1694.2 *12*	100 *12*	7973.6	(8⁺)	Q		
		2219.5 *16*	47 *6*	7446.2	(9⁺)	D+Q		
		3062.0 *21*	41 *6*	6604.6	(8⁺)			
9667.8	1	6892.9@ *15*	49 *27*	2775.42	2⁺			
		9667.8 *15*	100 *27*	0.0	0⁺			
9723.0	1⁽⁻⁾	6685.0@ *9*	139 *13*	3037.86	2⁺			
		9723.0 *9*	100 *13*	0.0	0⁺	(E1)		B(E1)(W.u.)=0.0019 *4*
9790.6	(10⁺)	2344.0 *16*	100	7446.2	(9⁺)	D+Q		
9843	1⁺	9842 *5*	100	0.0	0⁺	[M1]		B(M1)(W.u.)=0.09 *+4−9*
9886.8	(10⁺)	1811.4 *13*	69 *6*	8074.5	(8⁺)	Q		
		1913.2 *4*	100 *6*	7973.6	(8⁺)	Q		
10137.2	(10⁺)	2688.4 *19*	100 *8*	7446.2	(9⁺)			
		3533.0 *20*	92 *8*	6604.6	(8⁺)	Q		
10144.7	(10⁻)	799.1 *6*	100 *7*	9345.5	(10⁻)	D+Q		
		1117.8 *8*	21 *7*	9027.2	(9⁻)	D+Q		
		1426.1 *10*	21 *7*	8718.1	(9⁻)			
		2029.0 *10*	21 *7*	8115.1	(8⁻)			
		2162.9 *9*	14 *7*	7982.8	(8⁻)			
10180.8	(11⁻)	835.6 *6*	100 *3*	9345.5	(10⁻)	(M1+E2)	−0.09 *4*	
		1153.7 *10*	1.6 *5*	9027.2	(9⁻)			
		1463.9 *10*	12.1 *16*	8718.1	(9⁻)	Q		
10192.5	(11⁺)	1129.4 *8*	100 *4*	9062.7	(10⁺)	D+Q	−0.45 *6*	
		2072.7 *15*	22.4 *15*	8120.8	(9⁺)	Q		
		2746.6 *19*	39 *3*	7446.2	(9⁺)	Q		
10293.5	(9⁻)	3688.3 *28*	100 *33*	6604.6	(8⁺)			
		4207.7 *30*	33 *33*	6084.7	7⁻			
10394.1	(10⁺)	3078.0 *22*	50 *50*	7314.8	(8⁺)			
		3788.0 *27*	100 *50*	6604.6	(8⁺)			
10404.8	(9⁻)	4320.0 *30*	100	6084.7	7⁻			

From ENSDF

$^{58}_{28}Ni_{30}$-24

Adopted Levels, Gammas (continued)

$\gamma(^{58}Ni)$ (continued)

E_i(level)	J^π_i	E_γ ‡	I_γ ‡	E_f	J^π_f	Mult. †	δ †
10590.9	(11⁻)	410.3 *3*	31 *3*	10180.8	(11⁻)	D+Q	
		446.3 *3*	39 *3*	10144.7	(10⁻)	D+Q	
		1245.2 *9*	100 *6*	9345.5	(10⁻)	D+Q	
		1563.5 *11*	6 *3*	9027.2	(9⁻)		
		1872.5 *13*	42 *3*	8718.1	(9⁻)	Q	
10694.7	(10⁻)	289.9 *2*	10 *10*	10404.8	(9⁻)		
		401.0 *10*	20 *10*	10293.5	(9⁻)	D+Q	
		1350.0 *10*	10 *10*	9345.5	(10⁻)		
		1632.2 *11*	20 *10*	9062.7	(10⁺)		
		1798.2 *13*	20 *10*	8896.4?			
		2710.2 *19*	40 *10*	7982.8	(8⁻)	Q	
		3249.7 *23*	100 *10*	7446.2	(9⁺)	D	
10781.7	(11⁺)	991.1 *7*	50 *10*	9790.6	(10⁺)	D+Q	
		3336.0 *23*	100 *10*	7446.2	(9⁺)	Q	
10882.0	(11⁺)	1559.9 *11*	100	9322.1	(11⁺)	D+Q	
11005.6	(11⁻)	825.1 *6*	36 *7*	10180.8	(11⁻)	D+Q	
		1683.5 *12*	100 *7*	9322.1	(11⁺)		
11117.0	(11⁻)	1229.9 *9*	100 *13*	9886.8	(10⁺)	D+Q	−0.09 *7*
		1531.2 *11*	88 *13*	9585.2	(9⁻)		
		2090.0 *15*	38 *13*	9027.2	(9⁻)	Q	
11255.2	(11⁻)	560.6 *4*	100 *5*	10694.7	(10⁻)	(M1+E2)	−0.26 *5*
		1074.1 *8*	42 *5*	10180.8	(11⁻)		
11297.7	(12⁻)	707.0 *5*	38.8 *11*	10590.9	(11⁻)	(M1+E2)	−0.15 *5*
		1116.3 *8*	100 *3*	10180.8	(11⁻)	D+Q	−0.22 *3*
11413.1	(11⁺)	3966.2 *28*	100	7446.2	(9⁺)	Q	
11474.5	(12⁺)	1281.8 *9*	100 *5*	10192.5	(11⁺)	D+Q	−0.55 *8*
		1807.5 *13*	35 *3*	9666.9	(10⁺)	Q	
		2152.4 *15*	32 *3*	9322.1	(11⁺)	D+Q	−0.39 *7*
		2410.9 *17*	30 *3*	9062.7	(10⁺)	Q	
11579.3	(12⁺)	1386.7 *10*	100 *7*	10192.5	(11⁺)	D+Q	−0.35 *8*
		1692.7 *10*	27 *7*	9886.8	(10⁺)		
11814.3	(12⁻)	1223.8 *9*	52 *4*	10590.9	(11⁻)	D+Q	−0.08 *2*
		1633.8 *11*	100 *4*	10180.8	(11⁻)	D+Q	−0.07 *2*
		2467.9 *17*	56 *4*	9345.5	(10⁻)	Q	
11824.7	(12⁺)	1632.0 *10*	100	10192.5	(11⁺)	D+Q	−0.61 *14*
11996.4	(12⁻)	741.4 *5*	100 *6*	11255.2	(11⁻)	D+Q	
		1301.0 *10*	12 *6*	10694.7	(10⁻)	Q	
		1406.2 *10*	12 *6*	10590.9	(11⁻)		
		1813.8 *13*	18 *6*	10180.8	(11⁻)		
12155.1	(12⁻)	1564.0 *12*	67 *11*	10590.9	(11⁻)	D+Q	+0.15 *11*
		1974.1 *14*	100 *11*	10180.8	(11⁻)	D+Q	−0.27 *10*
12356.8	(12⁻)	1351.1 *9*	100 *10*	11005.6	(11⁻)		
		1766.0 *10*	40 *10*	10590.9	(11⁻)		

γ(^{58}Ni) (continued)

E_i(level)	J^π_i	E_γ‡	I_γ‡	E_f	J^π_f	Mult.†	δ†
12364.6	(12$^+$)	1582.5 *11*	75 *25*	10781.7	(11$^+$)		
		2171.4 *15*	50 *25*	10192.5	(11$^+$)		
		2478.0 *20*	50 *25*	9886.8	(10$^+$)		
		2697.0 *20*	50 *25*	9666.9	(10$^+$)		
		3302.1 *23*	100 *25*	9062.7	(10$^+$)	Q	
12570.1	(12$^+$)	991.0 *10*	14 *14*	11579.3	(12$^+$)		
		1157.0 *8*	29 *7*	11413.1	(11$^+$)		
		1789.0 *13*	14 *14*	10781.7	(11$^+$)		
		2174.9 *15*	14 *14*	10394.1	(10$^+$)		
		2377.8 *17*	14 *14*	10192.5	(11$^+$)		
		2390.1 *17*	100 *14*	10180.8	(11$^-$)	D	
		2431.0 *17*	29 *14*	10137.2	(10$^+$)		
		2682.9 *21*	43 *14*	9886.8	(10$^+$)		
		3248.0 *23*	71 *14*	9322.1	(11$^+$)	D+Q	−0.44 *11*
		3507.0 *25*	14 *14*	9062.7	(10$^+$)		
12719.2	(12$^+$)	1306.0 *10*	33 *33*	11413.1	(11$^+$)		
		2526.5 *18*	33 *33*	10192.5	(11$^+$)		
		2928.0 *20*	33 *33*	9790.6	(10$^+$)		
		3400.0 *24*	67 *33*	9322.1	(11$^+$)		
		3655.0 *26*	100 *33*	9062.7	(10$^+$)	Q	
12831.6	(13$^-$)	1534.1 *11*	100 *5*	11297.7	(12$^-$)		
		1713.6 *12*	77 *5*	11117.0	(11$^-$)	Q	
		2652.2 *19*	41 *5*	10180.8	(11$^-$)	Q	
12912.1	(13$^-$)	915.7 *6*	100 *5*	11996.4	(12$^-$)	D+Q	
		1657.0 *12*	30 *5*	11255.2	(11$^-$)		
12928		3606.0 *30*	100	9322.1	(11$^+$)		
13016.6	(13$^-$)	1718.3 *12*	100	11297.7	(12$^-$)	D+Q	
13048.2	(13$^-$)	1749.8 *12*	100 *7*	11297.7	(12$^-$)	D+Q	
		2044.3 *14*	29 *7*	11005.6	(11$^-$)		
13095.1	(12$^+$)	3772.2 *30*	100	9322.1	(11$^+$)	(D+Q)	
13129.2	(12$^+$)	3806.3 *30*	100 *50*	9322.1	(11$^+$)	(D+Q)	
13238.1	(13$^+$)	518.9 *4*	40 *2*	12719.2	(12$^+$)	D+Q	
		668.0 *5*	100 *4*	12570.1	(12$^+$)	D+Q	
		873.3 *6*	44 *4*	12364.6	(12$^+$)	D+Q	
		1424.5 *10*	28 *2*	11814.3	(12$^-$)	D	
		1764.1& *12*	10& *2*	11474.5	(12$^+$)		
		1941.7 *14*	30 *2*	11297.7	(12$^-$)	D	
		3045.0 *21*	2 *2*	10192.5	(11$^+$)		
13356.6	(13$^+$)	1881.5 *13*	100 *17*	11474.5	(12$^+$)		
		3164.1 *22*	83 *17*	10192.5	(11$^+$)	Q	
13606.8	(12$^+$)	3417.0 *24*	1×10^2 *1*	10192.5	(11$^+$)		
		4283.9 *31*	1×10^2 *1*	9322.1	(11$^+$)	D+Q	
13632		4310 *3*	100	9322.1	(11$^+$)		

From ENSDF

$\gamma(^{58}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡]	E_f	J^π_f	Mult.[†]	δ[†]
13850.1	(14⁻)	938.0 *7*	100 *5*	12912.1	(13⁻)	D+Q	
		1853.8 *13*	47 *5*	11996.4	(12⁻)	Q	
13884.2	(13⁺)	755.0 *10*	33 *33*	13129.2	(12⁺)		
		789.0 *10*	33 *33*	13095.1	(12⁺)	(D+Q)	
		2586.3 *25*	100 *33*	11297.7	(12⁻)	(D)	
13943		3750.0 *26*	100	10192.5	(11⁺)		
14127.8	(14⁺)	889.6 *6*	100 *5*	13238.1	(13⁺)	D+Q	
		1763.0 *10*	3.1 *10*	12364.6	(12⁺)		
14217.5	(14⁻)	1861.0 *13*	100 *20*	12356.8	(12⁻)	Q	
		2062.0 *15*	80 *20*	12155.1	(12⁻)	Q	
14455.8	(13⁺)	4261.7 *30*	100	10192.5	(11⁺)		
14853.1	(15⁻)	1835.6 *13*	8 *4*	13016.6	(13⁻)		
		2021.2 *14*	100 *12*	12831.6	(13⁻)	Q	
14920.9	(14⁺)	1564.3 *10*	14 *14*	13356.6	(13⁺)		
		3445 *2*	100 *14*	11474.5	(12⁺)	Q	
14934.7	(15⁻)	1084.8 *8*	100 *11*	13850.1	(14⁻)	D+Q	
		2022.2 *14*	78 *11*	12912.1	(13⁻)	Q	
15010.6	(14⁺)	1654.0 *10*	25 *13*	13356.6	(13⁺)		
		1773.0 *10*	25 *13*	13238.1	(13⁺)		
		3185.9 *22*	13 *13*	11824.7	(12⁺)		
		3431.0 *24*	25 *13*	11579.3	(12⁺)		
		3536.4 *30*	100 *13*	11474.5	(12⁺)	Q	
15031.0	(14⁺)	1674.0 *12*	40 *20*	13356.6	(13⁺)		
		3206.0 *30*	20 *20*	11824.7	(12⁺)		
		3451.4 *24*	20 *20*	11579.3	(12⁺)		
		3556.0 *25*	100 *20*	11474.5	(12⁺)	Q	
15105.2		1221.0 *10*	1×10^2 *1*	13884.2	(13⁺)		
		1976.0 *14*	1×10^2 *1*	13129.2	(12⁺)		
15187.0	(13⁺)	2057.0 *20*	1×10^2 *1*	13129.2	(12⁺)		
		4997 *4*	1×10^2 *1*	10192.5	(11⁺)		
15242.0		2193.7 *15*	100	13048.2	(13⁻)		
15266.3	(14⁺)	2249.9 *16*	29 *14*	13016.6	(13⁻)		
		2435.6 *17*	100 *14*	12831.6	(13⁻)	D	
15294.3	(14⁺)	1688.0 *12*	100 *11*	13606.8	(12⁺)	Q	
		2277.9 *16*	22 *11*	13016.6	(13⁻)		
		2462.2 *17*	44 *11*	12831.6	(13⁻)	D+Q	−0.13 *7*
15324.1	(14⁺)	3498.4 *25*	13 *13*	11824.7	(12⁺)		
		3849.0 *27*	100 *13*	11474.5	(12⁺)	Q	
15434.1	(13⁻)	3436.5[a] *24*	1×10^2 *1*	11996.4	(12⁻)		
		4136 *4*	1×10^2 *1*	11297.7	(12⁻)		
15709.3	(15⁺)	1581.3 *11*	100 *7*	14127.8	(14⁺)	D+Q	−0.22 *4*
		2470.0 *17*	29 *7*	13238.1	(13⁺)		
15736.9	(15⁺)	706.0 *10*	5.6 *13*	15031.0	(14⁺)		

Adopted Levels, Gammas (continued)

$\gamma(^{58}Ni)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ‡	E_f	J^π_f	Mult.†
15736.9	(15$^+$)	726.5 *5*	19 *6*	15010.6	(14$^+$)	
		1609.4 *11*	100 *6*	14127.8	(14$^+$)	D+Q
		2501.1 *18*	63 *6*	13238.1	(13$^+$)	Q
15858.2	(15$^+$)	847.6 *6*	5 *5*	15010.6	(14$^+$)	
		1731.1 *12*	100 *5*	14127.8	(14$^+$)	D+Q
16167.2		1062.0 *10*	1×10^2 *1*	15105.2		
		2283.0 *16*	1×10^2 *1*	13884.2	(13$^+$)	
16171.0	(15$^+$)	847.0 *10*	67 *33*	15324.1	(14$^+$)	
		1715.0 *12*	100 *33*	14455.8	(13$^+$)	Q
16246.6	(16$^-$)	1312.0 *9*	80 *20*	14934.7	(15$^-$)	D+Q
		2396.1 *17*	100 *20*	13850.1	(14$^-$)	Q
16496.6	(16$^-$)	2279.0 *19*	100	14217.5	(14$^-$)	Q
16567.0	(16$^+$)	708.6 *10*	33 *17*	15858.2	(15$^+$)	
		857.6 *6*	83 *17*	15709.3	(15$^+$)	D+Q
		1645.6 *12*	100 *17*	14920.9	(14$^+$)	Q
16676.4	(16$^+$)	818.4 *6*	87 *13*	15858.2	(15$^+$)	D+Q
		940.4 *7*	75 *13*	15736.9	(15$^+$)	
		1644.6 *12*	50 *13*	15031.0	(14$^+$)	Q
		1665.0 *12*	100 *13*	15010.6	(14$^+$)	Q
		2546.0 *18*	50 *13*	14127.8	(14$^+$)	Q
16798.0	(15$^-$)	1363.8 *10*	40 *20*	15434.1	(13$^-$)	Q
		1385.4 *10*	20 *20*	15412.6	(13$^-$)	
		1474[a]		15324.1	(14$^+$)	
		1503.9 *11*	100 *20*	15294.3	(14$^+$)	D
		1531.9 *11*	20 *20*	15266.3	(14$^+$)	
		1556.0 *10*	40 *20*	15241.9	(13$^-$)	
		3750		13048.2	(13$^-$)	
		3965 *3*	20 *20*	12831.6	(13$^-$)	Q
17019.6		2166.5 *15*	100	14853.1	(15$^-$)	
17163.1	(16$^+$)	992.1 *10*	100 *33*	16171.0	(15$^+$)	D+Q
		1839.1 *13*	67 *13*	15324.1	(14$^+$)	Q
		1896.6 *13*	67 *13*	15266.3	(14$^+$)	
17197		2092.0 *20*	100	15105.2		
17290.0	(16$^+$)	1965.0 *14*	15 *8*	15324.1	(14$^+$)	Q
		1996.0 *14*	100 *8*	15294.3	(14$^+$)	Q
		2023.9 *12*	15 *8*	15266.3	(14$^+$)	
		2436		14853.1	(15$^-$)	
17530.0	(17$^+$)	854.0 *6*	70 *10*	16676.4	(16$^+$)	
		962.8 *7*	15 *5*	16567.0	(16$^+$)	
		1793.3 *13*	100 *10*	15736.9	(15$^+$)	Q
		1819.5 *13*	60 *10*	15709.3	(15$^+$)	
17681.4	(17$^+$)	1004.8 *7*	50 *10*	16676.4	(16$^+$)	
		1113.8 *8*	30 *10*	16567.0	(16$^+$)	

γ(^{58}Ni) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$‡	I$_\gamma$‡	E$_f$	J$^\pi_f$	Mult.†	δ†
17681.4	(17$^+$)	1823.7 *13*	100 *10*	15858.2	(15$^+$)	Q	
		1944.8 *14*	70 *10*	15736.9	(15$^+$)	Q	
		1972.7 *14*	40 *10*	15709.3	(15$^+$)	Q	
18261.1	(17$^+$)	1097.9 *10*	17 *17*	17163.1	(16$^+$)	D+Q	
		2090.0 *10*	100 *33*	16171.0	(15$^+$)	Q	
18341.5	(16$^-$)	1583.0 *11*	17 *17*	16758	(14$^-$)		
		1596.0 *11*	17 *17*	16745	(14$^-$)		
		1634.0 *11*	83 *17*	16707	(14$^-$)	Q	
		1668.0 *12*	100 *17*	16673	(14$^-$)		
		3489.4 *24*	17 *17*	14853.1	(15$^-$)	D(+Q)	−0.02 *14*
18461.0	(17$^-$)	1170.5 *8*	17 *6*	17290.0	(16$^+$)	D+Q	−0.10 *6*
		1664.0 *12*	100 *6*	16798.0	(15$^-$)	Q	
18638.9	(18$^+$)	957.5 *7*	75 *8*	17681.4	(17$^+$)		
		1109.0 *10*	17 *8*	17530.0	(17$^+$)		
		1962.2 *14*	100 *8*	16676.4	(16$^+$)	Q	
		2073.0 *15*	33 *8*	16567.0	(16$^+$)	Q	
19196		2949.0 *30*	100	16246.6	(16$^-$)		
19205.4	(17$^-$)	864.0 *10*	33 *33*	18341.5	(16$^-$)	D+Q	
		1598.0 *10*	67 *33*	17607	(15$^-$)		
		1623.6 *11*	100 *33*	17582	(15$^-$)		
		1723.0 *13*	67 *33*	17482	(15$^-$)		
19482.5	(18$^+$)	1221.1 *10*	50 *50*	18261.1	(17$^+$)		
		2320.0 *16*	100 *50*	17163.1	(16$^+$)	(Q)	
19566.9	(18$^+$)	2276.9 *16*	100	17290.0	(16$^+$)	Q	
19945.7	(19$^+$)	1307.3 *9*	58 *8*	18638.9	(18$^+$)		
		2263.4 *16*	100 *8*	17681.4	(17$^+$)	Q	
		2415.0 *17*	42 *8*	17530.0	(17$^+$)	Q	
20135.4	(18$^-$)	930.0 *10*	33 *11*	19205.4	(17$^-$)		
		1794.0 *13*	100 *11*	18341.5	(16$^-$)	Q	
20450.1	(19$^-$)	1988.7 *14*	100	18461.0	(17$^-$)	Q	
20826.2	(19$^+$)	2565.0 *18*	100	18261.1	(17$^+$)	Q	
21106.3	(19$^-$)	971.0 *10*	14 *14*	20135.4	(18$^-$)	D+Q	
		1901.0 *14*	100 *14*	19205.4	(17$^-$)	Q	
21248.0	(20$^+$)	1301.8 *9*	50 *7*	19945.7	(19$^+$)		
		2609.0 *18*	100 *14*	18638.9	(18$^+$)	Q	
22138	(20$^+$)	2570.9 *18*	100	19566.9	(18$^+$)	Q	
22211.3	(20$^-$)	1105.0 *10*	22 *11*	21106.3	(19$^-$)	D+Q	
		2076.0 *15*	100 *11*	20135.4	(18$^-$)	Q	
22239.6	(20$^+$)	2757.0 *19*	100	19482.5	(18$^+$)	Q	
22767.9	(21$^+$)	1519.2 *11*	37 *13*	21248.0	(20$^+$)		
		2824.3 *20*	100 *13*	19945.7	(19$^+$)	Q	
22800.4	(21$^-$)	2349.7 *16*	100	20450.1	(19$^-$)	E2	
23331	(21$^-$)	1120		22211.3	(20$^-$)		

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Adopted Levels, Gammas (continued)

$\gamma(^{58}Ni)$ (continued)

E_i(level)	J_i^π	E_γ‡	I_γ‡	E_f	J_f^π	Mult.†
23331	(21^-)	2225.0 *16*	100	21106.3	(19^-)	Q
23741	(21^+)	2914.5 *25*	100	20826.2	(19^+)	Q
24211.9	(22^+)	1444.0 *10*	29 *14*	22767.9	(21^+)	
		2964.0 *19*	100 *14*	21248.0	(20^+)	Q
24611	(22^-)	1280		23331	(21^-)	
		2400.0 *17*	100 *17*	22211.3	(20^-)	Q
25141	(22^+)	3002.8 *21*	100	22138	(20^+)	Q
25552	(23^-)	2750.5 *19*	100	22800.4	(21^-)	Q
25918	(23^-)	2587.0 *18*	100	23331	(21^-)	Q
26059.7	(23^+)	1848.0 *13*	50 *50*	24211.9	(22^+)	
		3291.0 *23*	100 *50*	22767.9	(21^+)	Q
27366	(24^-)	2755.0 *20*	100	24611	(22^-)	Q
28709	(25^-)	3157.0 *22*	100	25552	(23^-)	Q
28931	(25^-)	3014.0 *21*	100	25918	(23^-)	Q
		3379		25552	(23^-)	

E_i(level)	J_i^π	E_γ‡	E_f	J_f^π
30491	(26^-)	3125	27366	(24^-)
32175	(27^-)	3466	28709	(25^-)
32495	(27^-)	3564	28931	(25^-)
		3786	28709	(25^-)
33972	(28^-)	3480	30491	(26^-)
36045	(29^-)	3870	32175	(27^-)
36535	(29^-)	4040	32495	(27^-)
37810	(30^-)	3838	33972	(28^-)
40333	(31^-)	4288	36045	(29^-)
40931	(31^-)	4396	36535	(29^-)
42007	(32^-)	4197	37810	(30^-)
2868.1+x		2868	x	
6083.2+x		3215	2868.1+x	
9667.3+x		3584	6083.2+x	

† Mainly from $\gamma(\theta)$ in (p,p′γ). Some assignments are from DCO values in (^{24}Mg,α2pγ). The multipolarity assignments for γ rays from (γ,γ') are from polarization asymmetry measurements.

‡ Values represent averages of all available data. For γ rays taken from (γ,γ') work only, values are level-energy differences, without applying any correction for recoil, which is at most 1 keV.

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

@ Multiply placed.

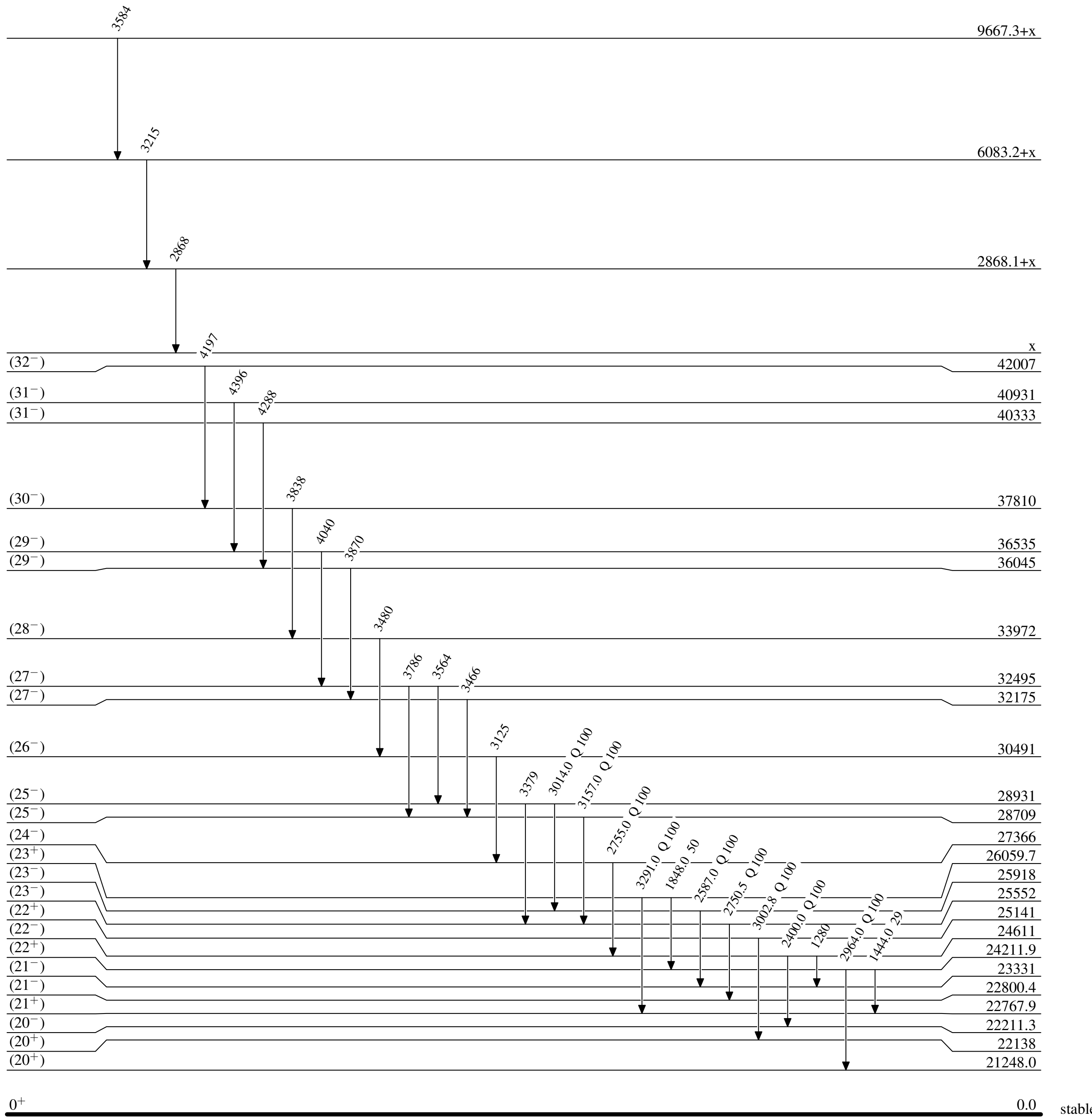
& Multiply placed with intensity suitably divided.

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

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

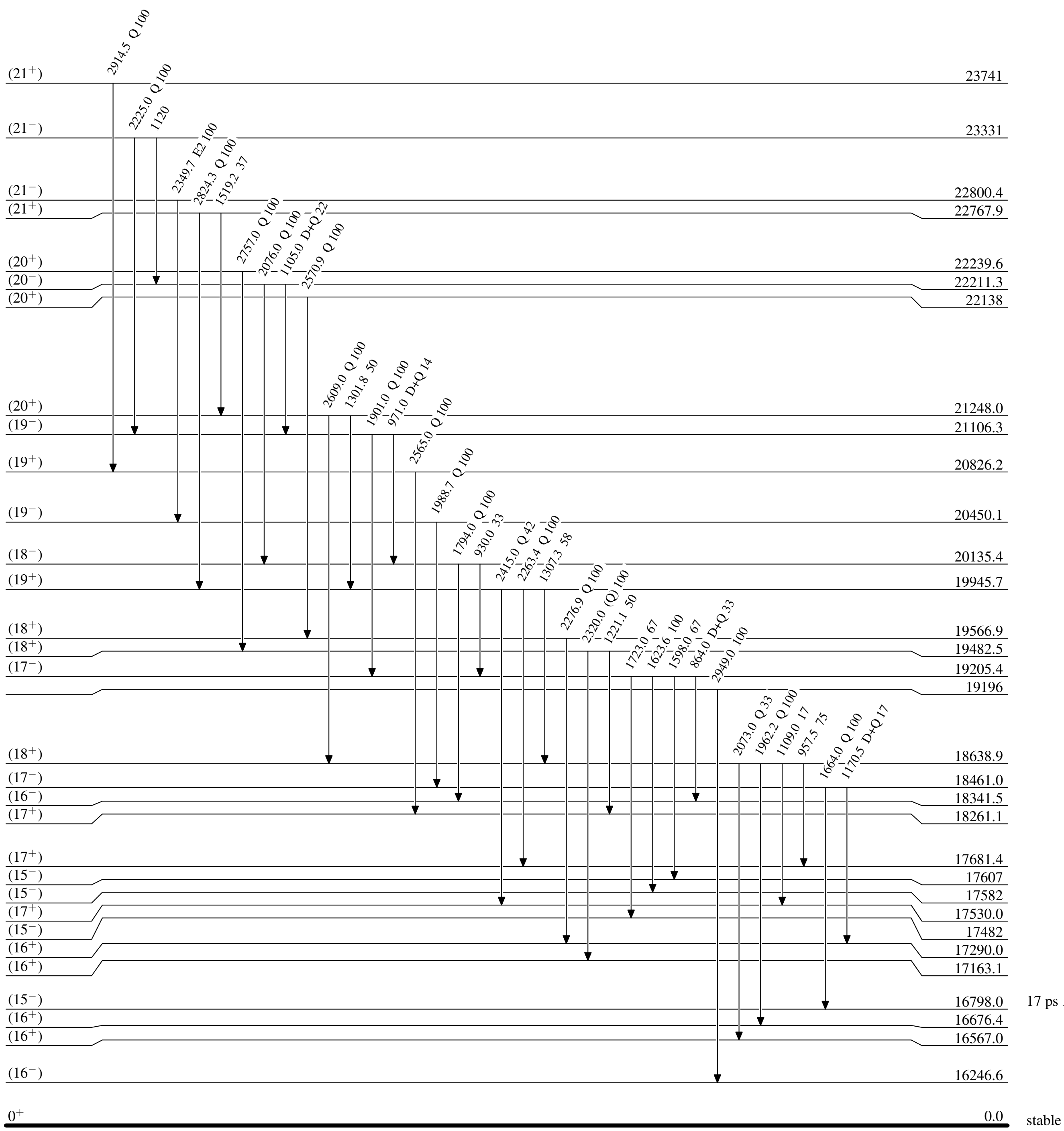


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{58}_{28}Ni_{30}$

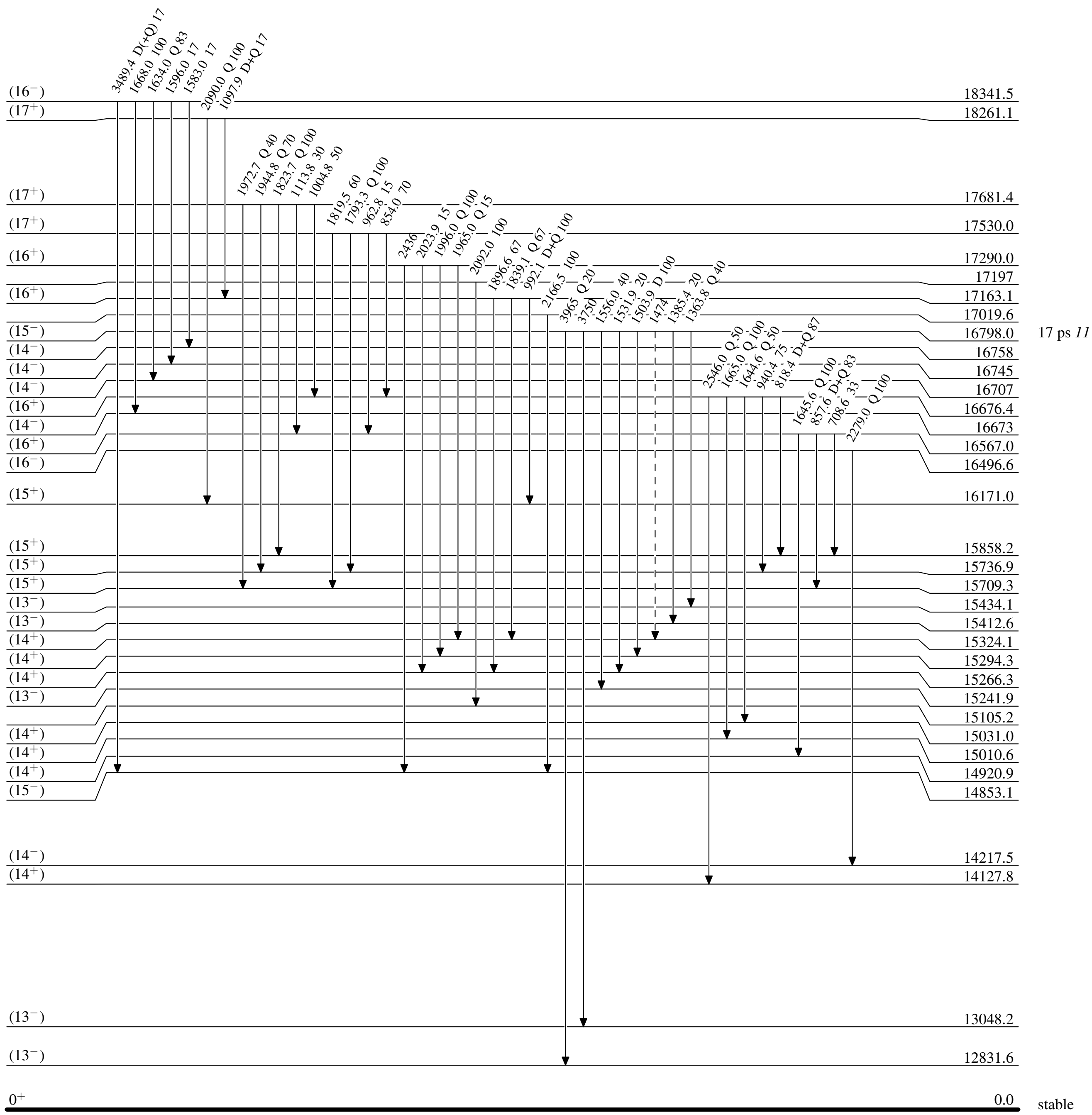
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

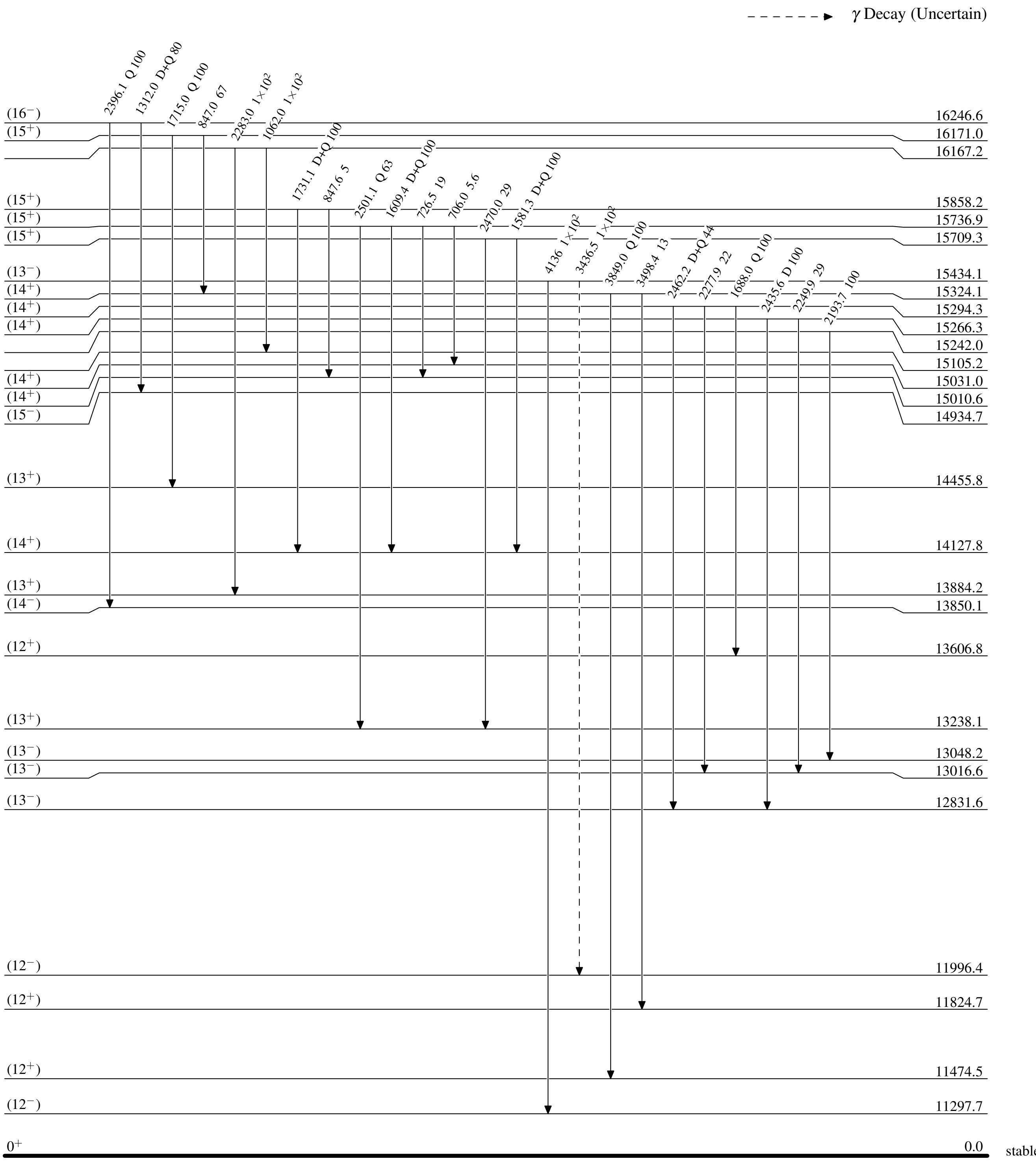


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

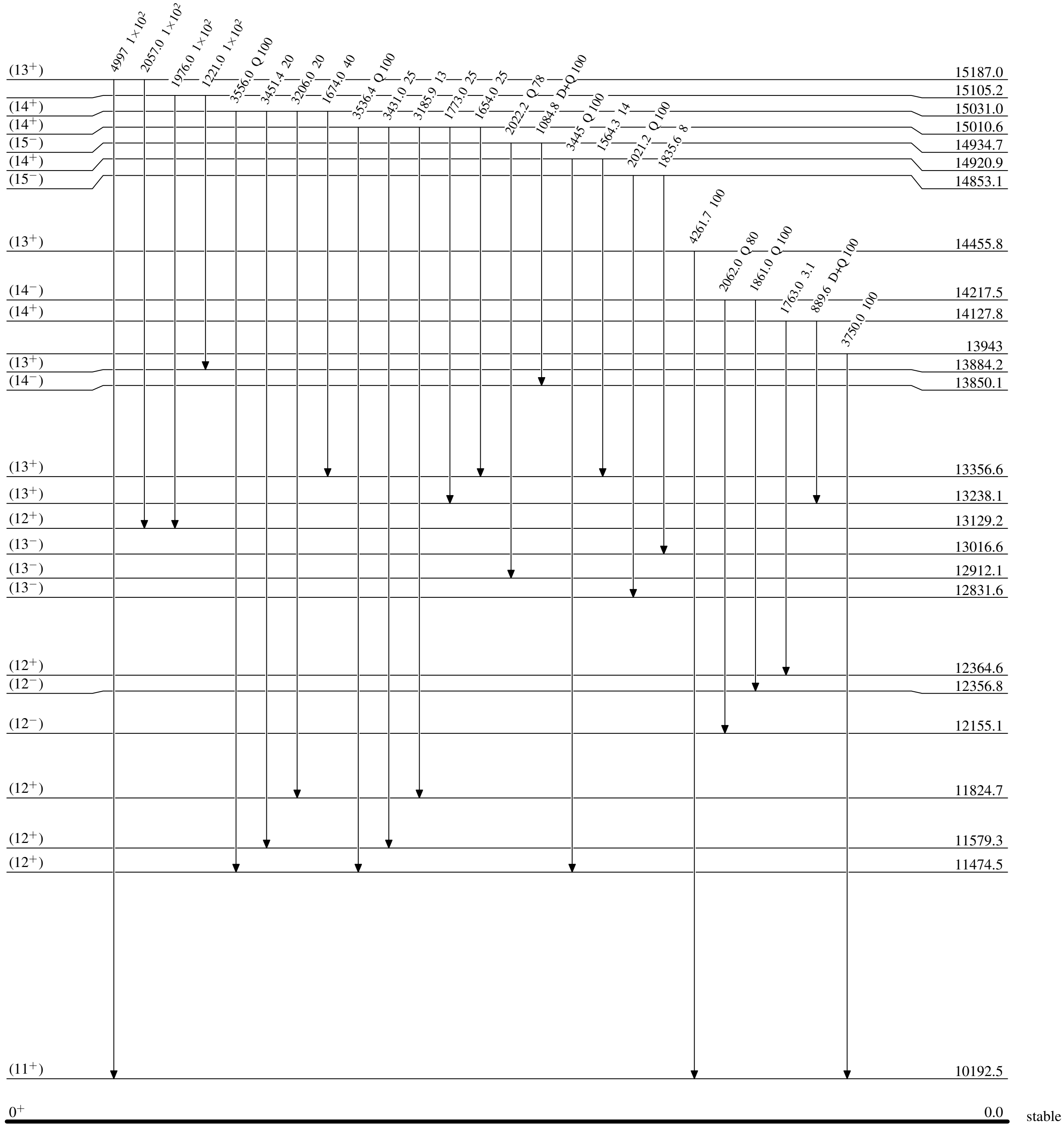


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

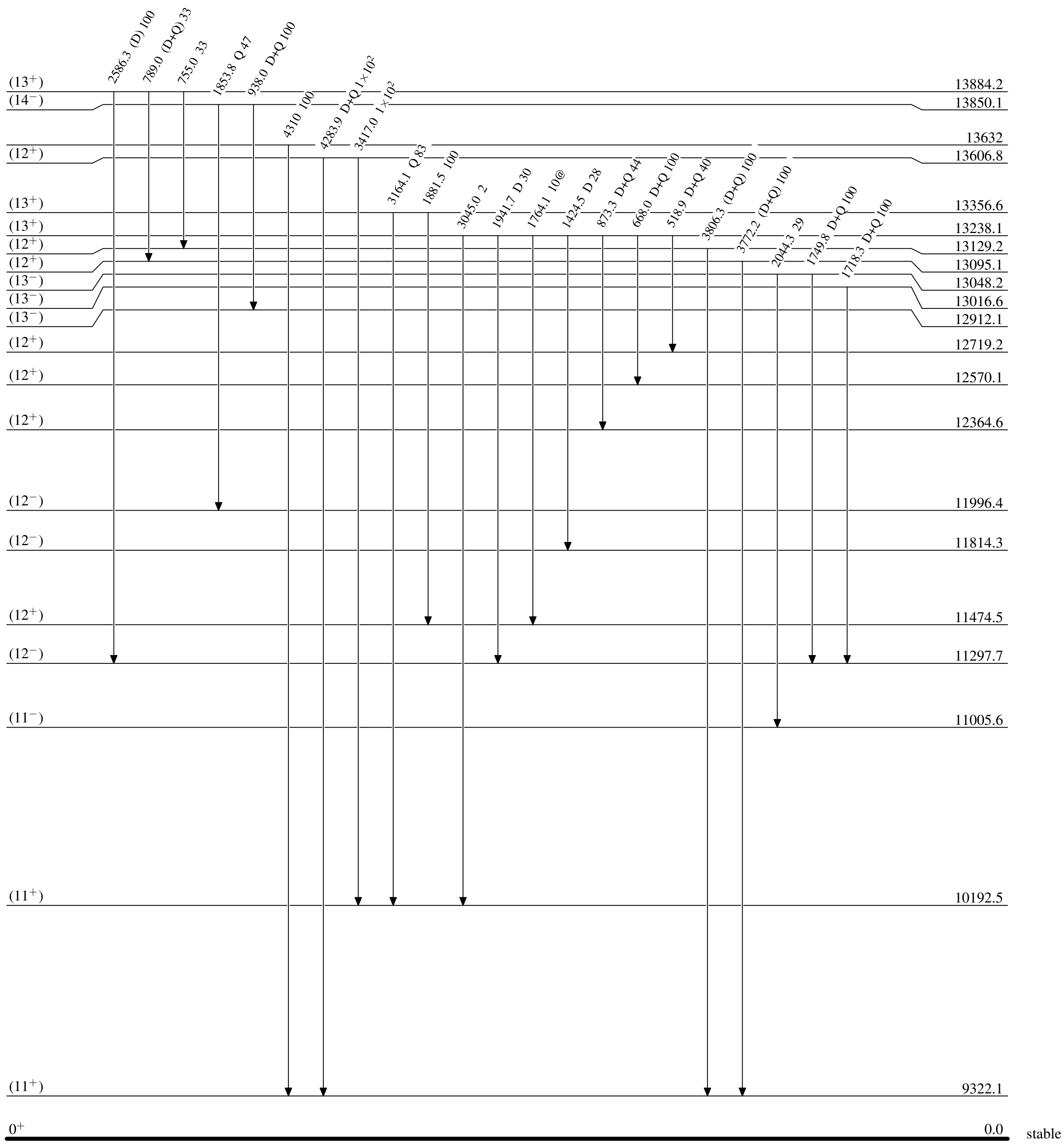


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

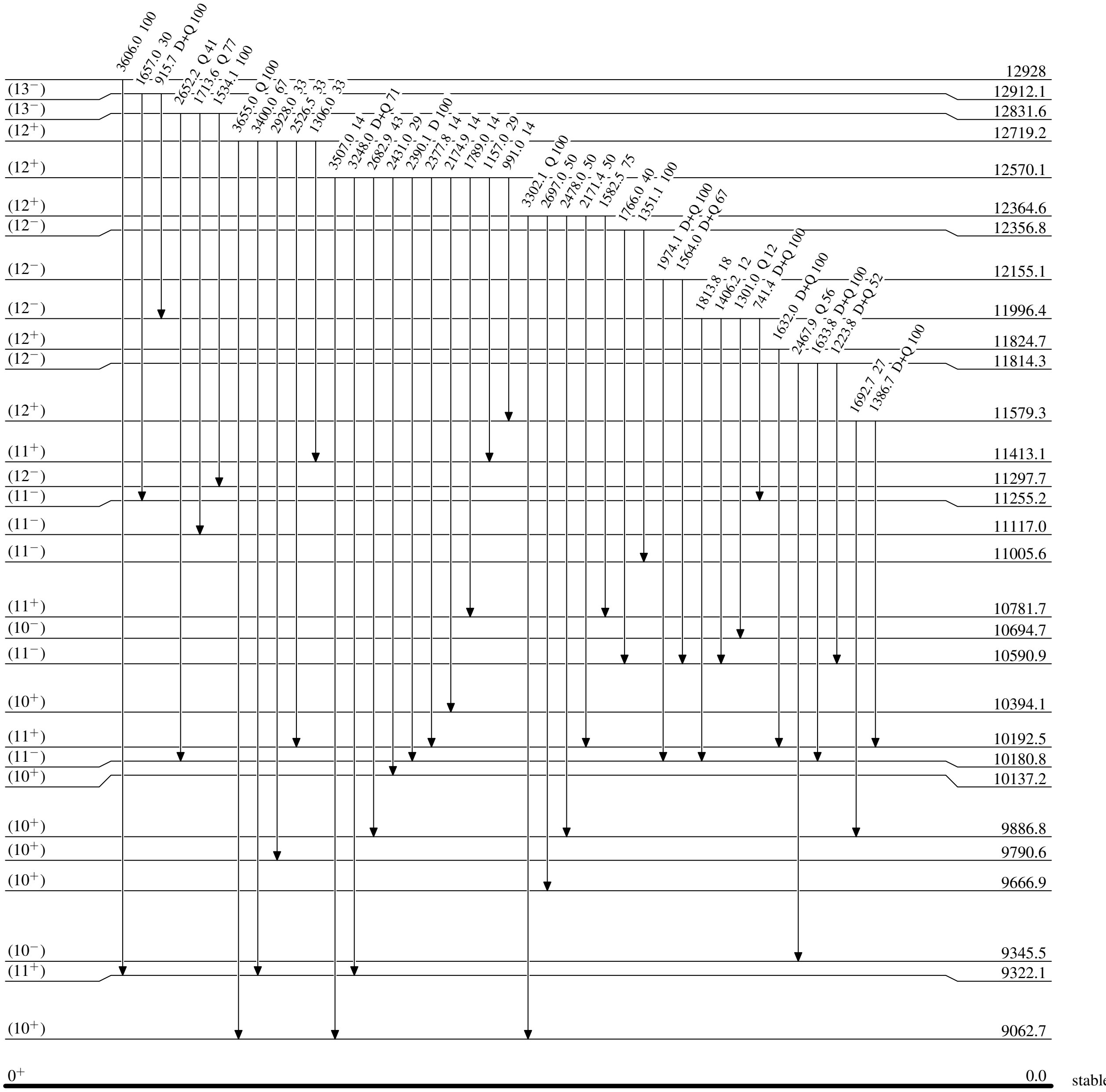


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

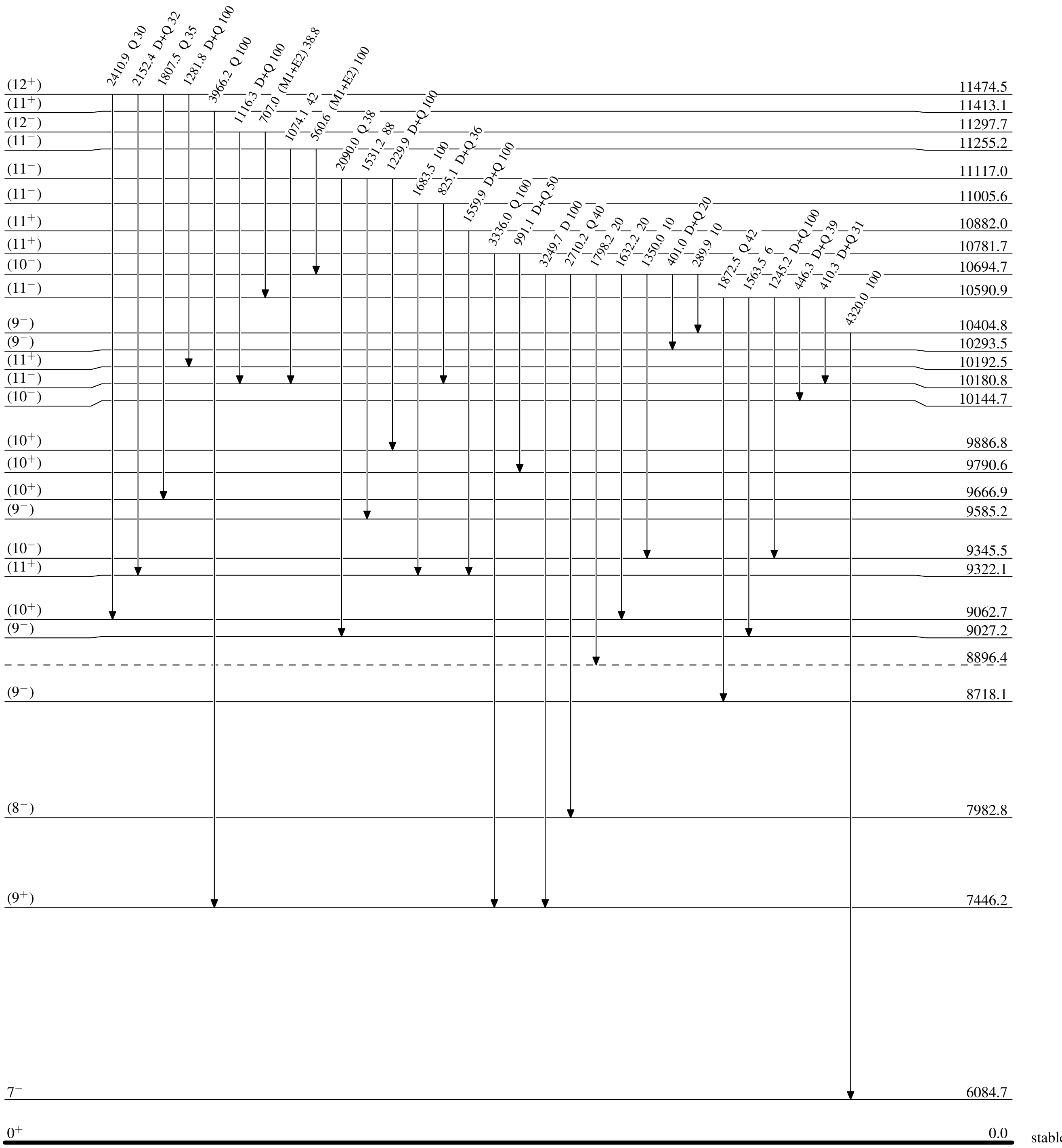


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

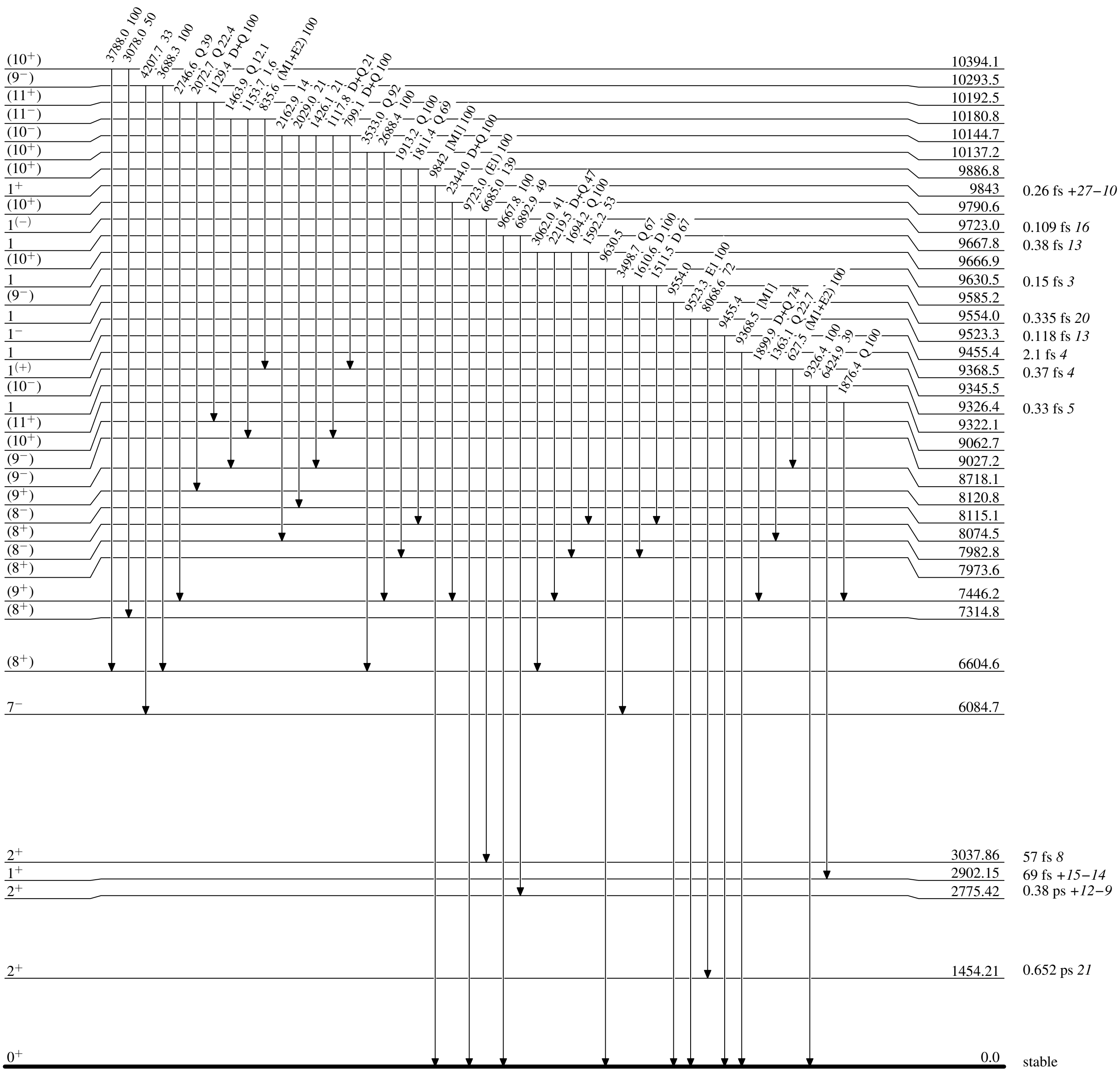


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided



$^{58}_{28}Ni_{30}$

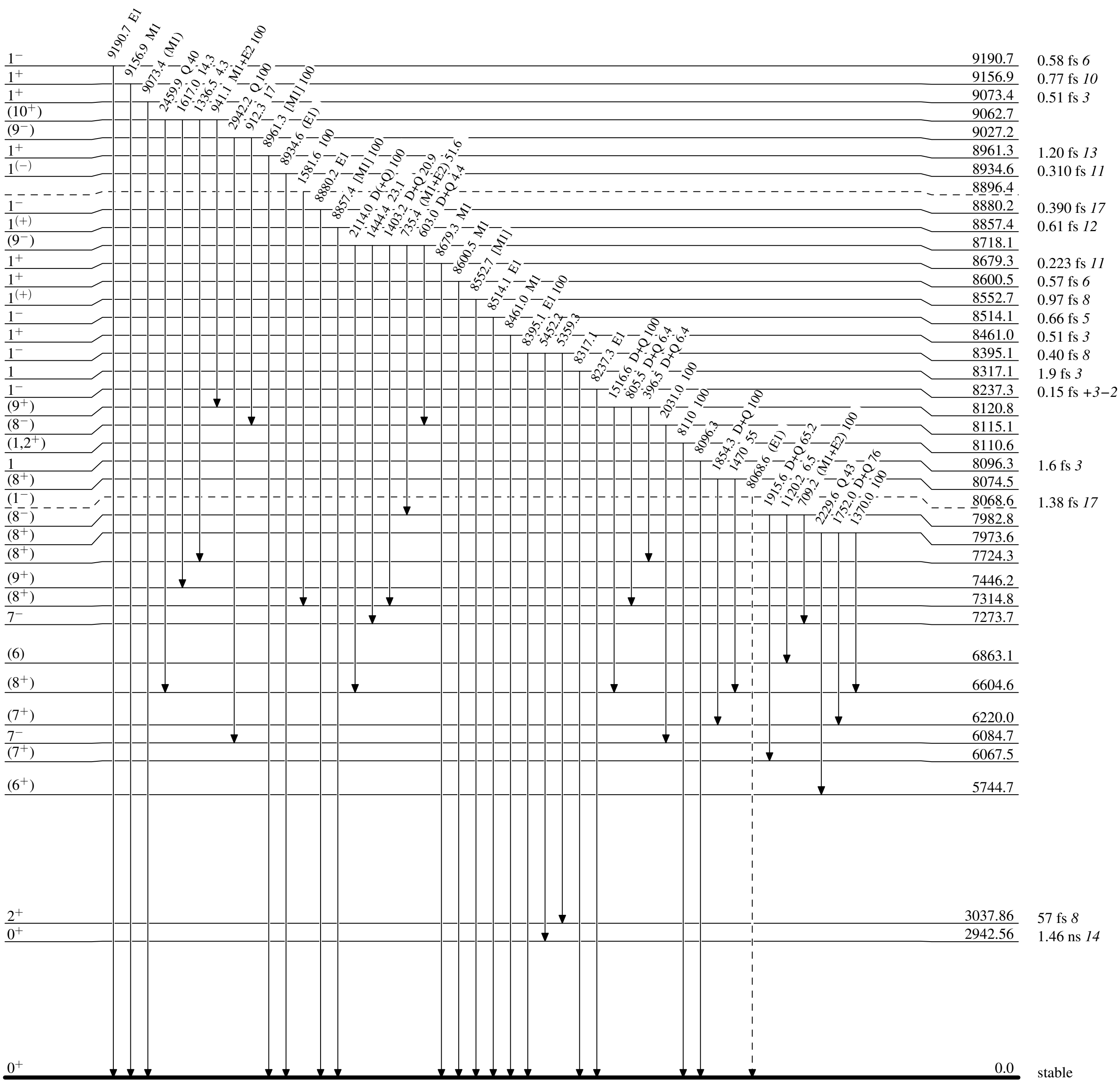
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

γ Decay (Uncertain)



$^{58}_{28}Ni_{30}$

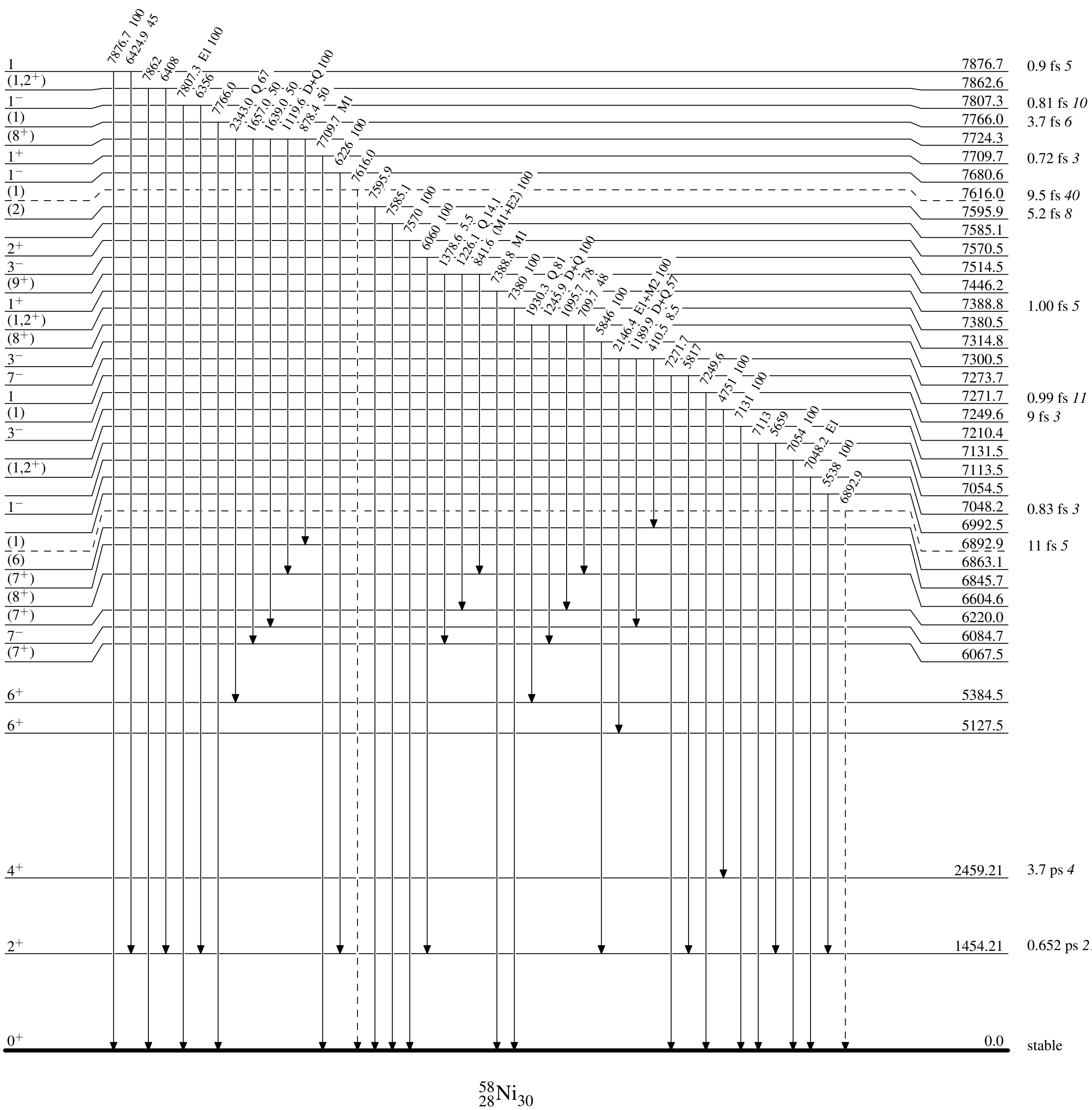
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

Legend

γ Decay (Uncertain)



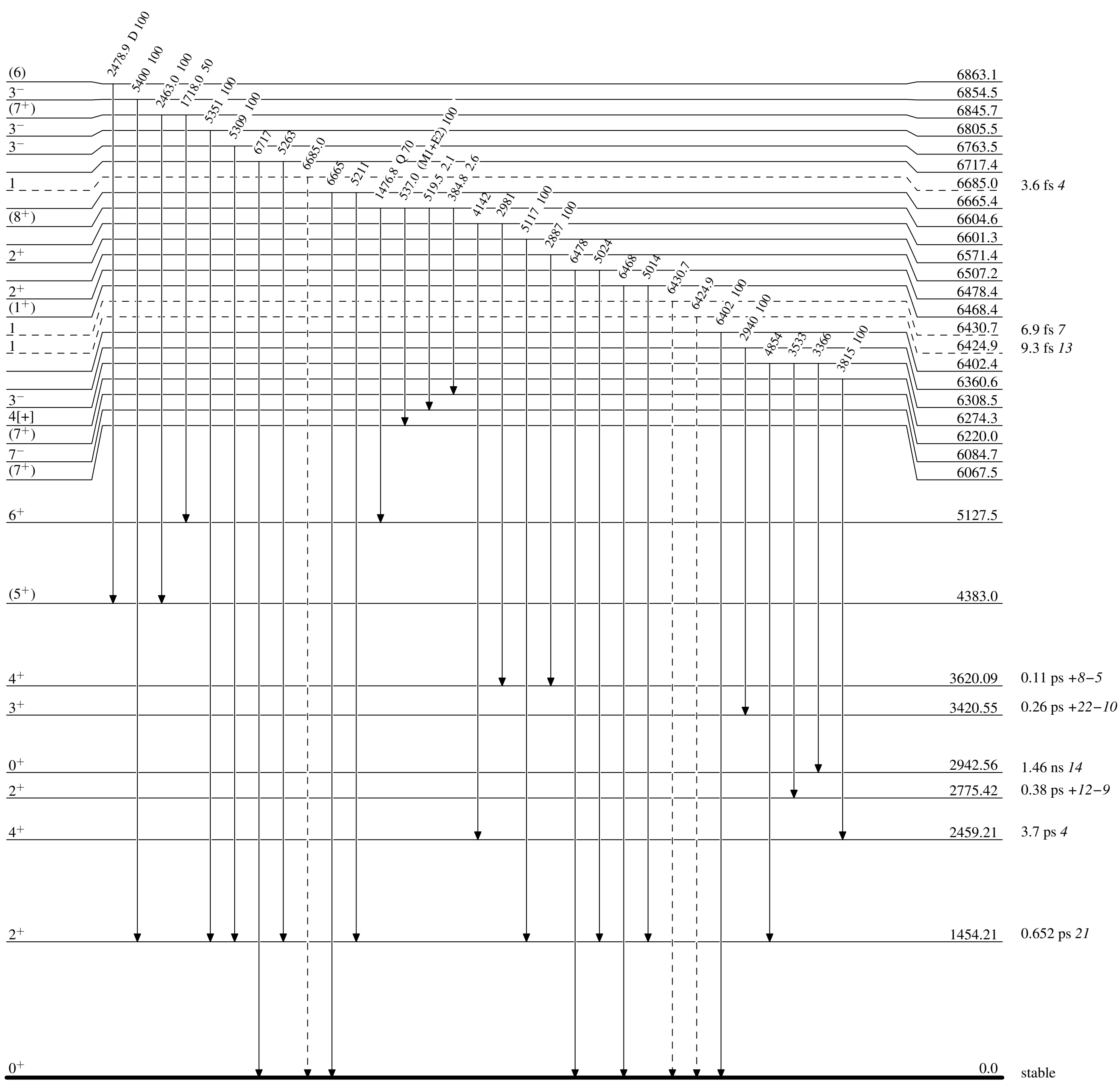
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

γ Decay (Uncertain)



$^{58}_{28}Ni_{30}$

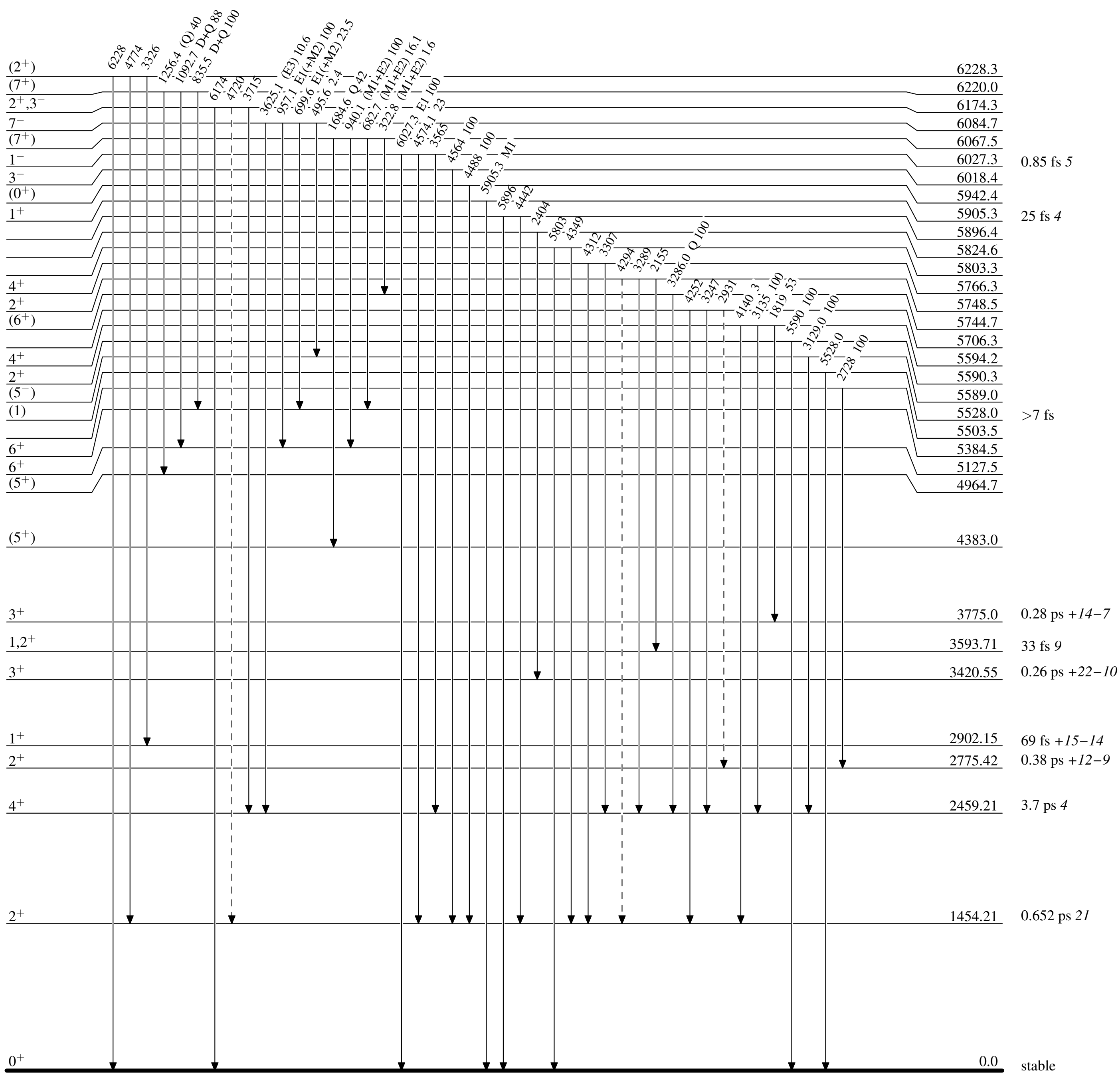
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

γ Decay (Uncertain)



$^{58}_{28}Ni_{30}$

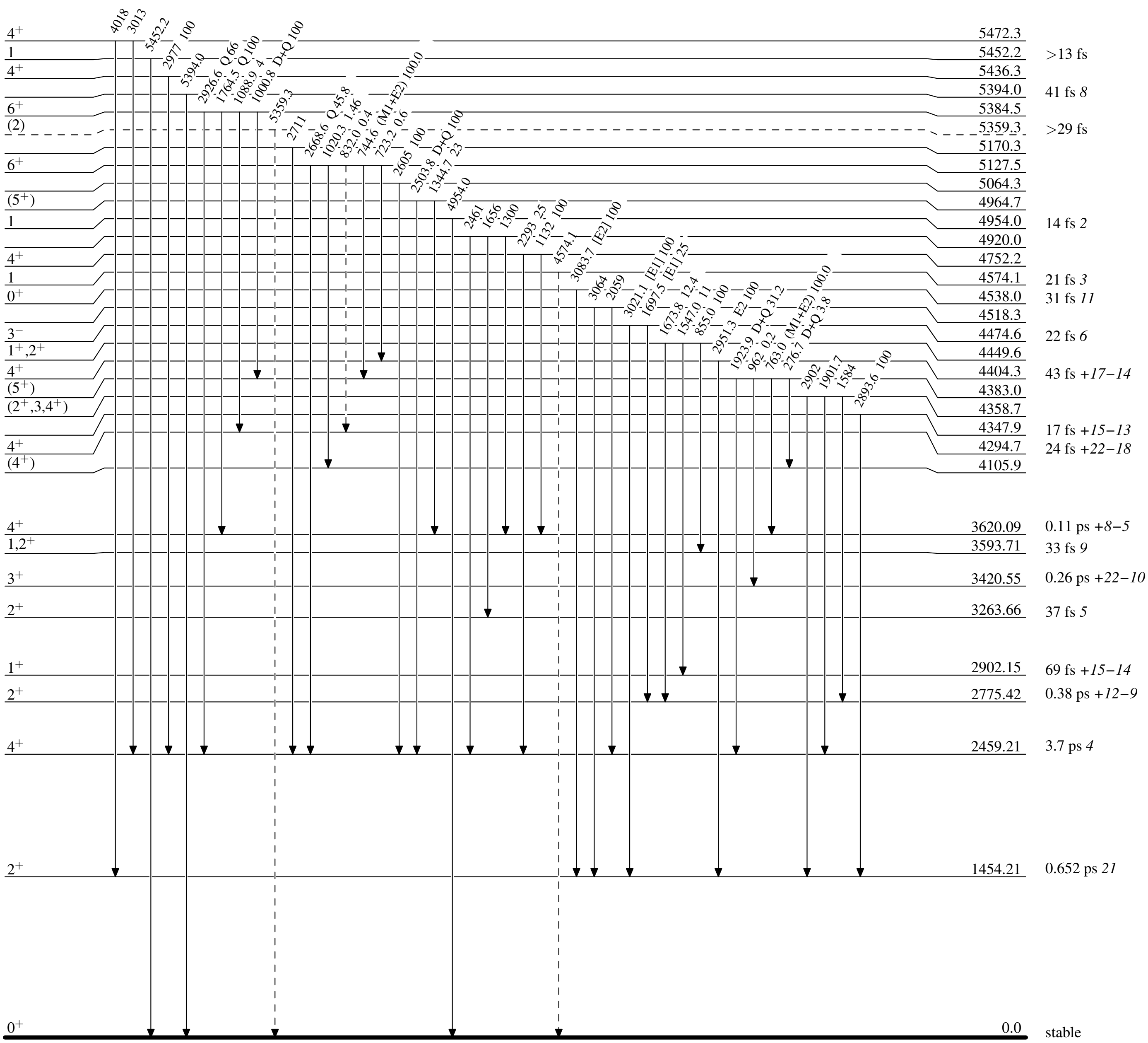
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

Legend

γ Decay (Uncertain)



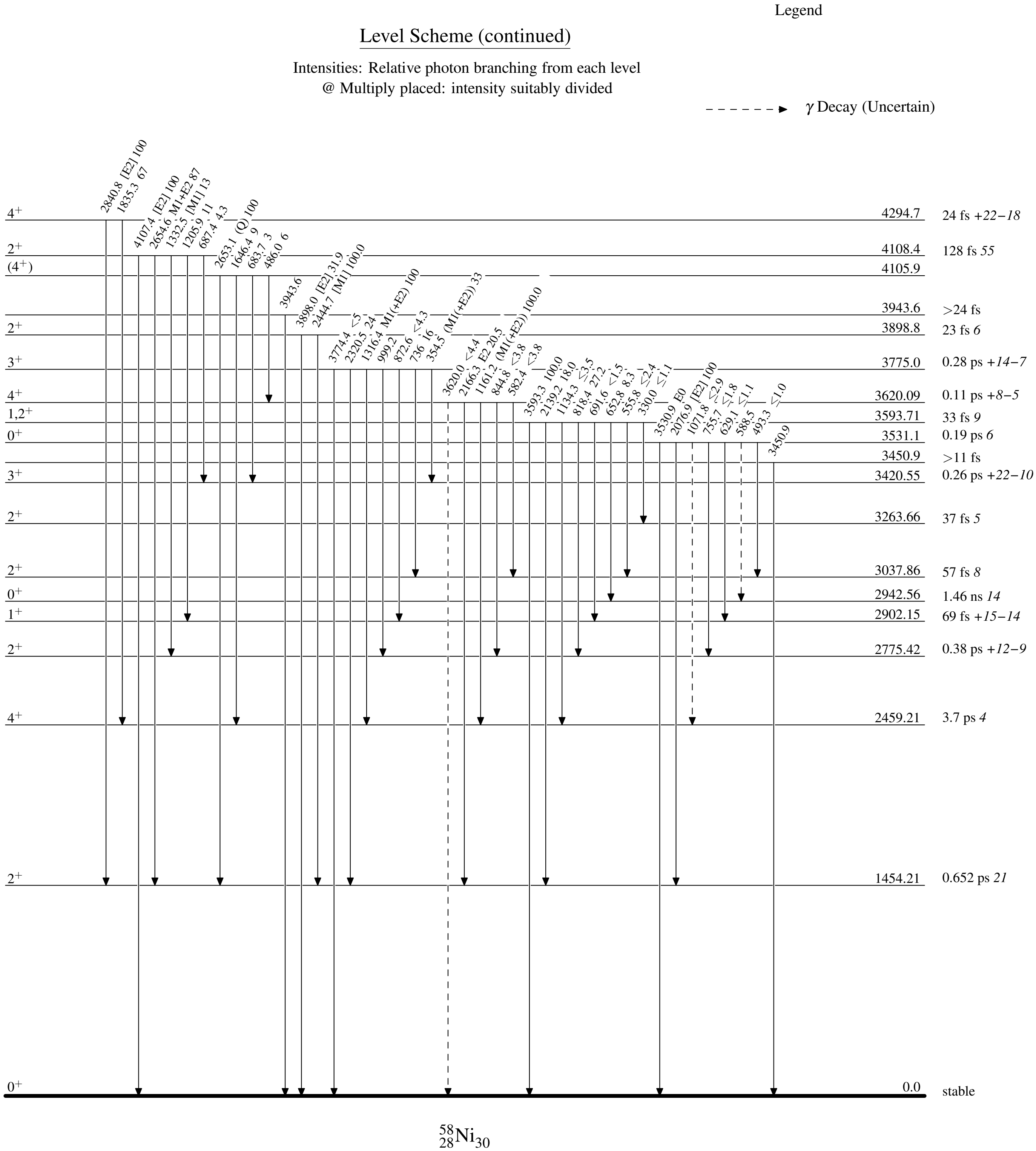
$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

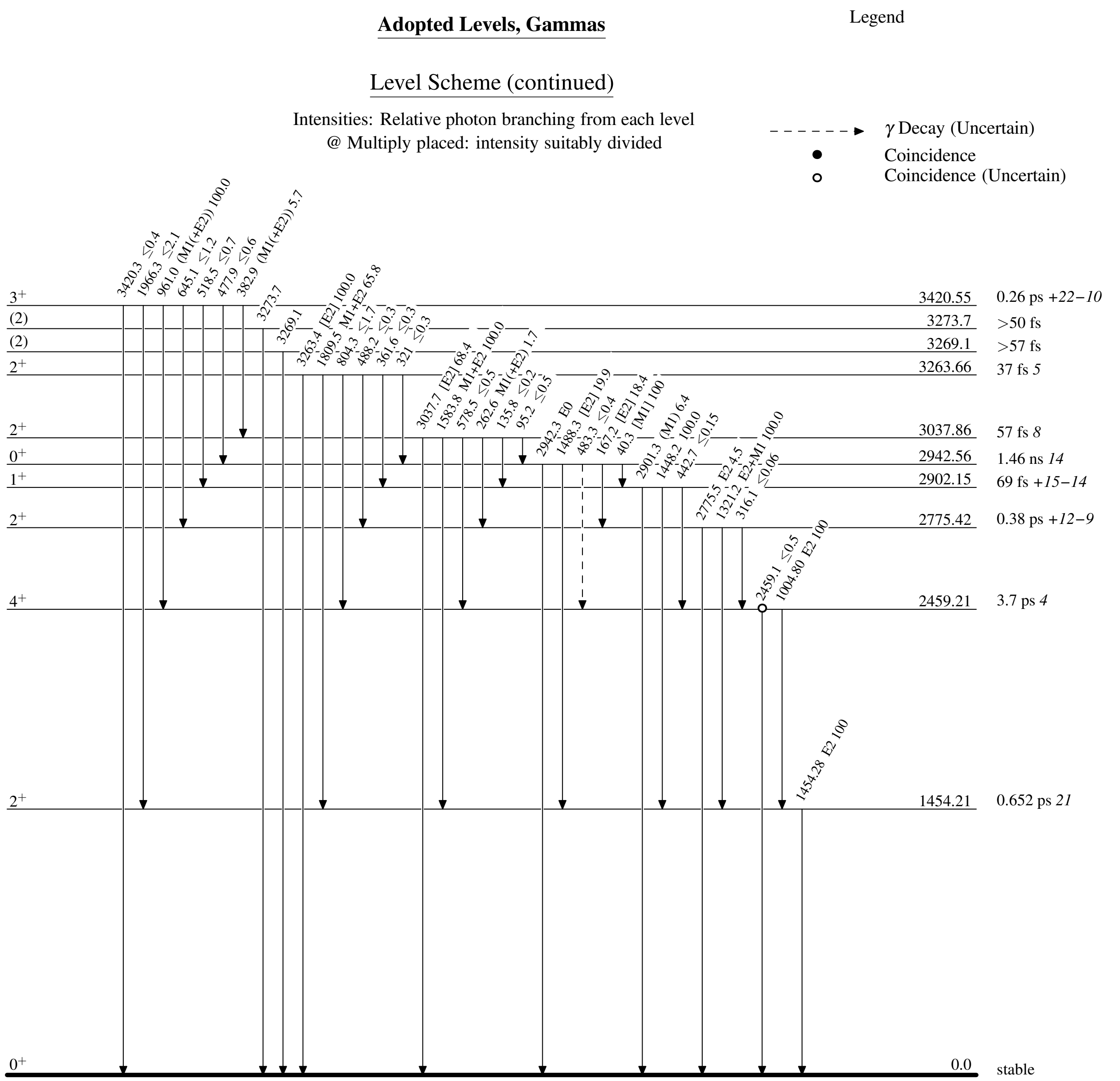
@ Multiply placed: intensity suitably divided



Adopted Levels, Gammas

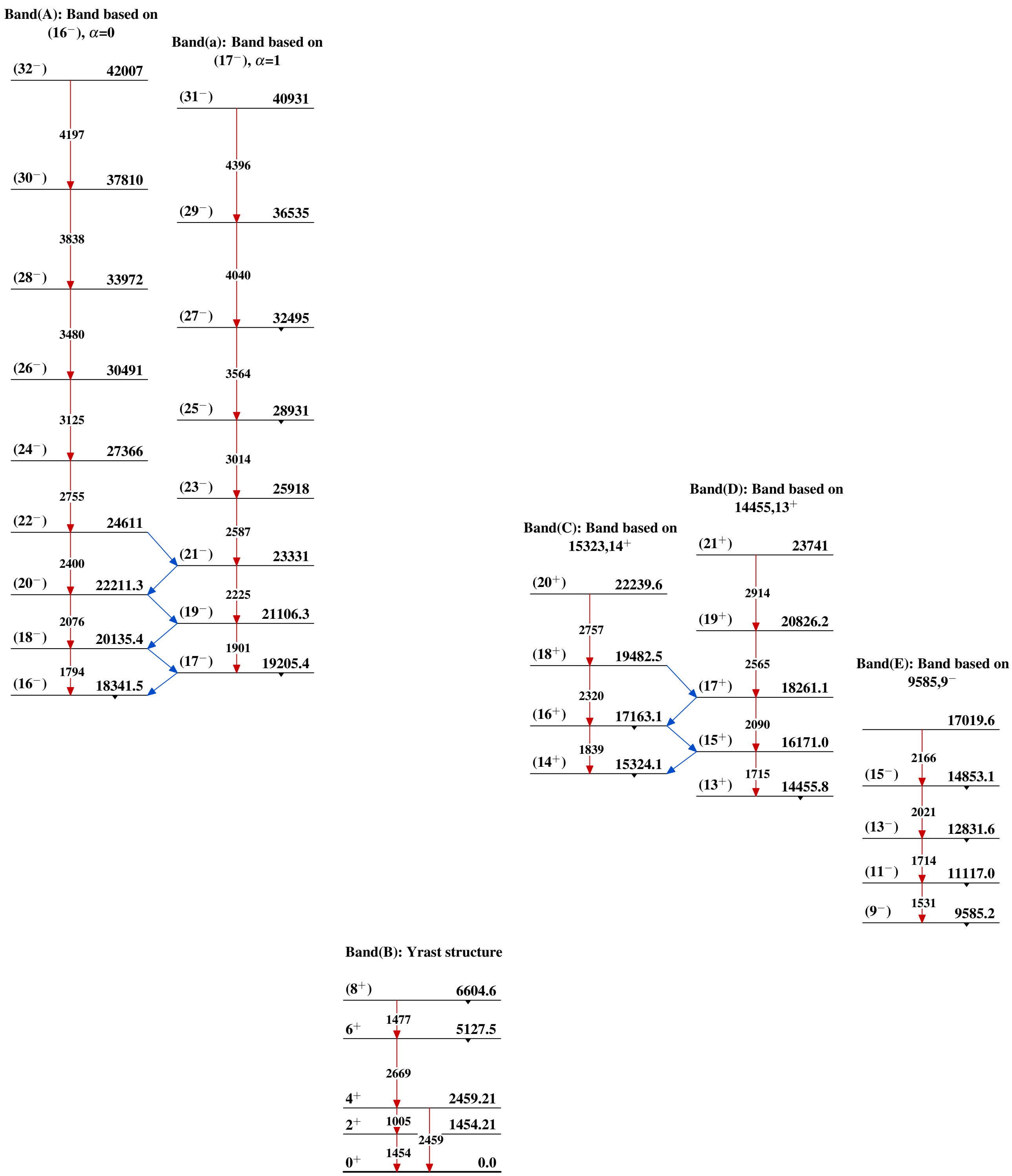
Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided



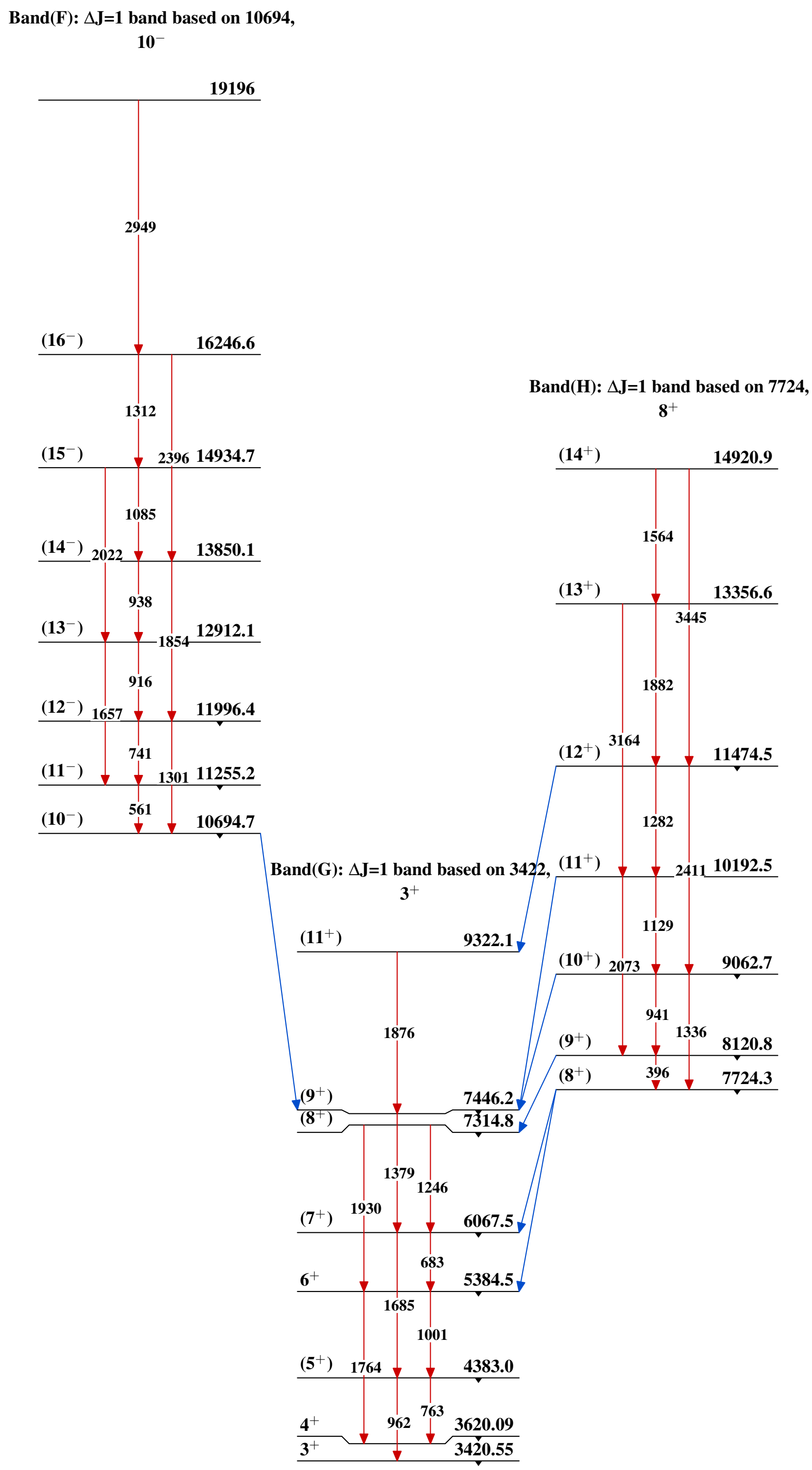
$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas



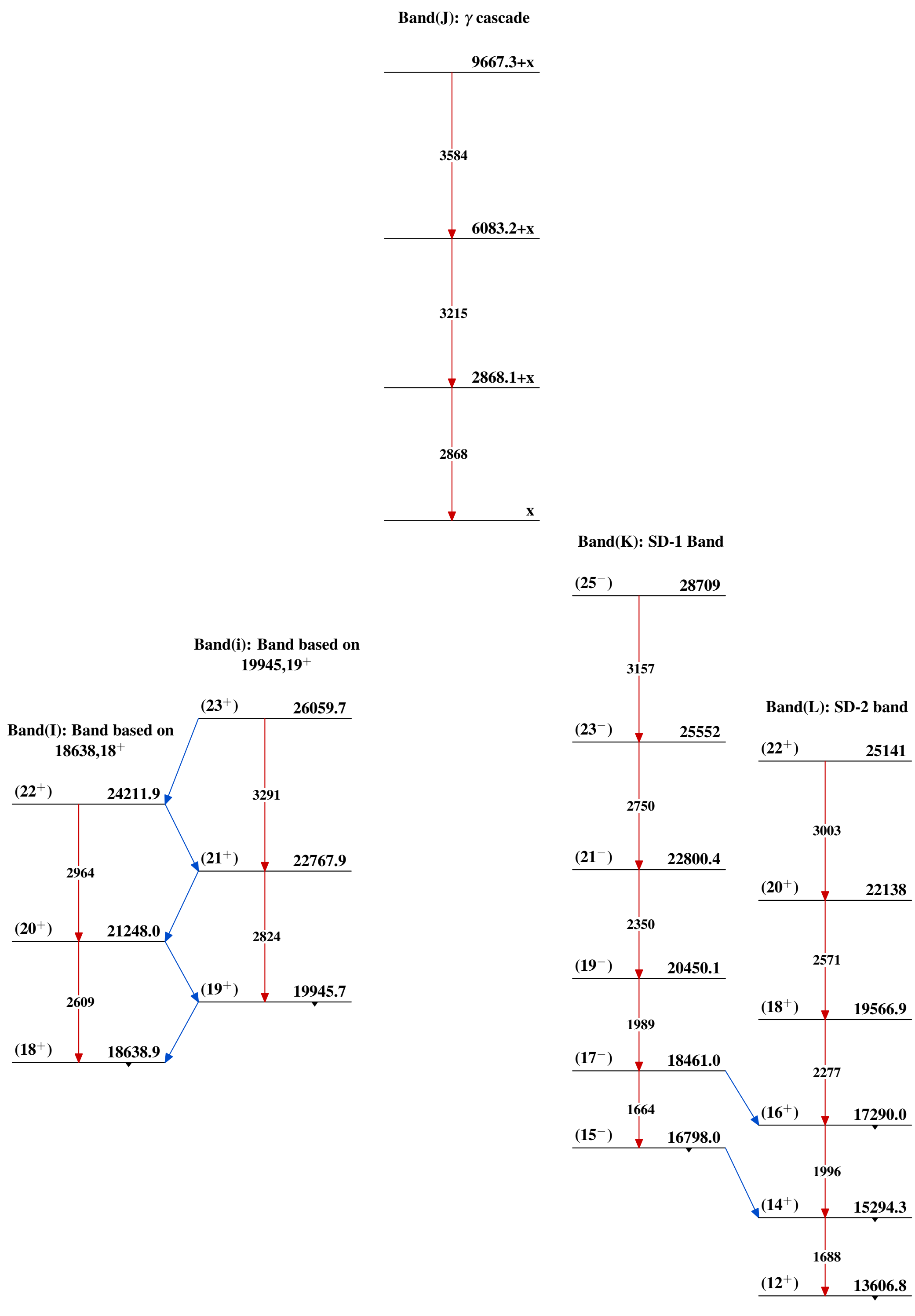
$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas (continued)



$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas (continued)



$^{58}_{28}Ni_{30}$