Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huo Junde, Huo Su, Yang Dong	NDS 112,1513 (2011)	29-Oct-2009

Q(β^-)=−1.567×10^4 *syst*; S(n)=16643.0 *7*; S(p)=7166.6 *4*; Q(α)=−8000 *7* 2012Wa38
Note: Current evaluation has used the following Q record −15303 SY16639 167165 11-7997 13 2003Au03.
ΔQ(β^-)=140.
Other reaction: ^{24}Mg(^{32}S,X).

^{56}Ni Levels

Cross Reference (XREF) Flags

A	^{58}Ni(p,t)	E	^{9}Be(^{57}Ni,^{56}NiXγ)	I	^{56}Ni(d,d′):giant res
B	^{54}Fe(^{3}He,n),(^{3}He,nγ),(α,2nγ)	F	^{28}Si(^{32}S,2p2nγ)	J	^{57}Zn εp decay:47 ms
C	^{54}Fe(^{16}O,^{14}C),(^{12}C,^{10}Be)	G	^{28}Si(^{36}Ar,2$\alpha\gamma$)	K	Coulomb excitation
D	^{56}Cu ε decay (93 ms)	H	^{40}Ca(^{28}Si,3$\alpha\gamma$)		

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[&]	XREF	Comments
0.0	0$^+$	6.075 d *10*	ABCDEFGH JK	%ε+%β^+=100 T$_{1/2}$: from 1992Da15. Others: 6.10 d *2* (1963We06), 6.4 d *1* (1952Sh30), 6.0 d *5* (1952Wo15), 5.9 d *1* (1990Su13), and 5.8 d *6* (1961Mo10).
2700.6 *7*	2$^+$	53 fs *+34−17*	ABCDEFGH JK	β_2=0.173 *17*; B(E2)↑=0.060 *12* (1995Kr17); B(E2)↑=0.049 *12* (2004Yu10) T=0 (2001Bo54)
3923.6 *13*	4$^+$	>0.7 ps	ABCDEFGH	T=0 (2001Bo54)
3956.6 *13*	0$^+$		AB	
4932 *3*	(3$^-$,5$^-$)		A	
4935.5 *6*	(3$^+$)		A DEF	T=0 (2001Bo54)
5003.7 *13*	0$^+$		AB	
5315.7 *16*	6$^+$		ABC FGH	
5352.5 *8*	2$^+$		AB GH	
5483.7 *13*	4$^+$		AB D	T=0 (2001Bo54)
5665.1 *15*	5		AB EF	XREF: A(5679).
5799 *3*			A	
5988.1 *6*	4$^+$		A D	T=0 (2001Bo54) XREF: A(5985). J^π=(3$^+$) and T=0,1 quoted in 2001Bo54 have been revised by the authors. The revised note further suggests that J^π=(4$^+$) and T=0 are favored by shell-model calculations. L(p,t)=4.
6011 *3*	1$^-$		ABC	XREF: B(6000).
6236 *3*	(2$^+$)		A	
6326.4 *11*	4$^+$[#]		AB GH	
6405.8 *13*			B	
6431.9 *7*	4$^+$		A D	T=1 (2001Bo54) IAS of 4$^+$ g.s. in ^{56}Co.
6522.1 *18*	5		A F	
6554.6 *8*	(2$^+$)		AB	XREF: A(6572).
6588.6 *8*	(3$^+$)		CD	T=1 (2001Bo54) XREF: C(6570). J^π=(3,4,5)$^{(+)}$ and T=0,1 quoted in 2001Bo54 have been revised by the authors. The revised assignment is based on a comparison of energy differences of isobaric analog states in ^{56}Ni and ^{56}Cu.
6650.5 *15*	6$^+$		F H	
6654.8 *13*	0$^+$[#]		AB	T=0 (1974Na19) XREF: A(6662).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{56}Ni Levels (continued)

E(level)†	Jπ‡	XREF	Comments
6730 *8*		A	
7025 *10*		AB	XREF: B(7060).
7144 *6*	1^-	AB	XREF: B(7120).
7250 *8*	(1^-)	A	
7289 *25*	(0^+)	A	
≈7400	(6^+)@	C	
7442.8 *13*	2^+	AB	T=1 (1970Br48) XREF: A(7433).
7576 *6*	3^-	AB	
7601.4 *17*	(7^+)	F H	
7652.6 *14*	6^+#	C GH	XREF: C(7650).
7670 *8*	0^+#	AB	XREF: B(7690).
7801 *10*	(1^-)	A	
7903.7 *10*	0^+	AB	T=1 (1974Na19) XREF: A(7913). IAS of 0^+ 1450 keV in ^{56}Co.
7954.7 *15*	8^+	B FGH	
8080 *30*	2^+#	ABC	
8143 *10*		A	
8223.7 *16*	8^+	FGH	
8479 *10*	2^+#	A	XREF: A(8520).
8575 *10*		A	
8674 *8*	2^+#	AB	XREF: B(8690).
8778.5 *17*	(7)	C F H	XREF: C(8700).
8796 *6*	4^+	A	
8870 *12*		ABC G	
9009.7 *17*	9^+	AB F H	
9042 *8*		A	
9109 *8*	(4^+)@	A C	XREF: C(9100).
9154 *10*		A	
9240.5 *22*	(8^+)	A F	
9309.5 *17*	8^+#	AB GH	
9418.3 *17*	10^+	B FGH	
9450 *8*	(2^+)#	AB	
9477.7 *17*	(9^+)	F H	
9596 *6*		A	
9676 *6*		A	
9735.5 *19*	7@	ABC G	%p≈100 XREF: B(9720)C(9700). This level decays by protons to $7/2^-$, g.s. in ^{55}Co. E(p)(lab)=2540 *30*, observed in (proton)(summed γ) coin spectrum.
9756 *5*	(0^+)#	AB	
9824 *3*		A	
9943 *4*	0^+	ABC	T=2 (1984Ka07) Double IAS of 0^+ g.s. in ^{56}Fe.
9994 *3*	0^+	A	
10011 *6*	0^+	AB	T=2 (1984Ka07)
10041 *6*	0^+	A	T=2 (1984Ka07)
10055 *3*		A	
10095 *5*		A	
10150 *5*		A	
10250 *6*	0^+#	BC	
10331 *10*		A	

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Adopted Levels, Gammas (continued)

^{56}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
10377 *10*		A	
10428 *8*		A	
10469.7 *18*	9	F H	
10655 *10*	(4$^+$)[@]	ABC	XREF: C(10550).
10677.3 *17*	10$^+$	FGH	
10820 *20*	2$^+$[#]	AB	XREF: A(10785).
10854 *10*		A	
10935.5 *18*	9[@]	B GH	XREF: B(10950).
11001.8 *18*	(10$^+$)	H	
11055 *15*		A	
11294.7 *20*	(10$^+$)[#]	BC GH	XREF: B(11200)C(11300).
11420.6 *17*	11$^+$	B F H	XREF: B(11500).
11800 *30*	2$^+$[#]	BC	
11866.7 *22*	(10$^+$)	B F H	XREF: B(12000).
12358.8 *18*	12$^+$	B F H	XREF: B(12300).
12508.5 *19*	11[@]	F H	
13505.7 *18*	(12)	F H	
13578 *3*	12$^+$[#]	GH	
13644.4 *24*	(12$^+$)	GH	J^{π}: from earlier paper 2006Jo03 from the same group as 2008Jo04.
14454.5 *21*	13[@]	GH	
14735 *3*	14$^+$	GH	
15.3×10^3 *2*		C	
16358 *4*	13	GHI	XREF: I(16200).
16773 *3*	15[@]	GH	
18632 *5*	(16$^+$)	G	
19521 *5*	17[@]	G I	XREF: I(19300).
22459 *7*		G	

[†] For states connected by gammas, the excitation energies are from Eγ by using a least-squares adjustment procedure. The rest are from ^{58}Ni(p,t), except as noted.
[‡] From L transfer in ^{58}Ni(p,t), except as noted.
[#] From L transfer in ^{54}Fe(^{3}He,n).
[@] From L transfer in ^{54}Fe(^{16}O,^{14}C), (^{12}C,^{10}Be).
[&] From DSA in ^{54}Fe(^{3}He,n), (^{3}He,nγ).

γ(^{56}Ni)

E_i(level)	J^{π}_i	E_γ[†]	I_γ[†a]	E_f	J^{π}_f	Mult.[†]	Comments
2700.6	2$^+$	2700.6[‡] *3*	100[‡] *3*	0.0	0$^+$	E2	B(E2)(W.u.)=5.8 *+19−38*
3923.6	4$^+$	1224.5[‡] *2*	100[‡] *5*	2700.6	2$^+$	E2	B(E2)(W.u.)<23
3956.6	0$^+$	1256[&]		2700.6	2$^+$		
4935.5	(3$^+$)	1010.4[‡] *4*	100[‡] *17*	3923.6	4$^+$		
		2234.5[‡] *7*	60[‡] *16*	2700.6	2$^+$		
5003.7	0$^+$	2303[&]		2700.6	2$^+$		
5315.7	6$^+$	1392[#] *1*	100[#] *4*	3923.6	4$^+$	E2[#]	
5352.5	2$^+$	2650 *1*	60 *20*	2700.6	2$^+$	D+Q	
		5351 *2*	100 *20*	0.0	0$^+$	E2	
5483.7	4$^+$	2780.4 *4*	14.5 *12*	2700.6	2$^+$		

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Adopted Levels, Gammas (continued)

γ(^{56}Ni) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†a]	E_f	J^π_f	Mult.[†]
5665.1	5	1741[#] 1	100[#] 10	3923.6	4^+	D
5988.1	4^+	2062.8[‡] 4	100[‡] 27	3923.6	4^+	
		3287.4[‡] 5	78[‡] 10	2700.6	2^+	
6326.4	4^+	976 1	67 17	5352.5	2^+	E2
		2402 1	25 8	3923.6	4^+	
		3626 1	100 8	2700.6	2^+	E2
6405.8		3705[&]		2700.6	2^+	
6431.9	4^+	950.7[‡] 5	15[‡] 2	5483.7	4^+	
		2506.7[‡] 3	100[‡] 5	3923.6	4^+	
6522.1	5	857[#] 1	100[#] 11	5665.1	5	
6554.6	(2^+)	3854[&]		2700.6	2^+	
		6554[&]		0.0	0^+	
6588.6	(3^+)	1653.1[‡] 4	5.9[‡] 13	4935.5	(3^+)	
6650.5	6^+	2726[#] 1	100[#] 20	3923.6	4^+	E2[#]
6654.8	0^+	3954[&]		2700.6	2^+	
7442.8	2^+	4742[&]		2700.6	2^+	
7601.4	(7^+)	2285[#] 1	100[#] 18	5315.7	6^+	(E2+M1)[#]
7652.6	6^+	1326 1	100 17	6326.4	4^+	E2
		3729 2	4 4	3923.6	4^+	E2
7903.7	0^+	2551[&]	11[&] 6	5352.5	2^+	
		5203[&]	100[&] 6	2700.6	2^+	
7954.7	8^+	1304[#] 1	8[#] 1	6650.5	6^+	E2[#]
		2638[#] 1	100[#] 6	5315.7	6^+	E2[#]
8223.7	8^+	2908[#] 1	100[#] 8	5315.7	6^+	E2[#]
8778.5	(7)	3114[#] 2	<48[#]	5665.1	5	
		3462[#] 1	100[#] 19	5315.7	6^+	
9009.7	9^+	787[#] 1	82[#] 7	8223.7	8^+	E2+M1[#]
		1055[#] 1	100[#] 8	7954.7	8^+	E2+M1[#]
9240.5	(8^+)	3924[#] 2	100[#] 27	5315.7	6^+	(E2)[#]
9309.5	8^+	1657 1	100 12	7652.6	6^+	E2
9418.3	10^+	1463[#] 1	100[#] 6	7954.7	8^+	E2[#]
9477.7	(9^+)	1523[#] 1	100[#] 19	7954.7	8^+	(E2+M1)[#]
		1876[#] 2	67[#] 19	7601.4	(7^+)	[#]
9735.5	7	845 2	1×10^2 1	8870		(E2)
		2083 2	1×10^2 1	7652.6	6^+	
10469.7	9	2515[#] 1	100[#] 38	7954.7	8^+	D[#]
10677.3	10^+	2453[#] 1	100[#] 15	8223.7	8^+	E2[#]
10935.5	9	1200 1	100 12	9735.5	7	E2
		1626 1	52 8	9309.5	8^+	D
11001.8	(10^+)	3047[@] 1	100[@] 25	7954.7	8^+	(E2)[@]
11294.7	(10^+)	1987[@] 1	1.0×10^2[@] 5	9309.5	8^+	
11420.6	11^+	2002[#] 1	3.7[#] 16	9418.3	10^+	E2+M1[#]
		2412[#] 1	3.2[#] 6	9009.7	9^+	E2[#]
11866.7	(10^+)	2626[@b] 2	<35[@]	9240.5	(8^+)	
		3912[@] 2	100[@] 21	7954.7	8^+	(E2)[@]

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Adopted Levels, Gammas (continued)

$\gamma(^{56}Ni)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†a]	E_f	J_f^π	Mult.[†]
12358.8	12^+	1681[#] *1*	61[#] *10*	10677.3	10^+	E2[#]
		2940[#] *1*	100[#] *14*	9418.3	10^+	E2[#]
12508.5	11	1212[@] *1*	61[@] *11*	11294.7	(10^+)	
		1573[@] *1*	100[@] *15*	10935.5	9	E2[@]
13505.7	(12)	1146[@] *1*	61[@] *11*	12358.8	12^+	
		2086[@] *1*	100[@] *15*	11420.6	11^+	
13578	12^+	2282 *2*	100 *18*	11294.7	(10^+)	E2
13644.4	(12^+)	2349 *3*	10×10^2 *3*	11294.7	(10^+)	
		4226 *2*	7×10^1 *3*	9418.3	10^+	
14454.5	13	1946 *1*	100 *14*	12508.5	11	E2
14735	14^+	2377 *2*	9 *3*	12358.8	12^+	E2
16358	13	2779 *3*	100 *33*	13578	12^+	D
16773	15	2318 *2*	100 *7*	14454.5	13	E2
18632	(16^+)	3897 *4*	<100	14735	14^+	
19521	17	2748 *4*	100 *14*	16773	15	E2
22459		2938[@] *4*	1.0×10^2[@] *5*	19521	17	[@]

[†] From $^{28}Si(^{36}Ar,2\alpha\gamma)$, except as noted.
[‡] From ^{56}Cu ε decay.
[#] From $^{28}Si(^{32}S,2p2n\gamma)$.
[@] From $^{40}Ca(^{28}Si,3\alpha\gamma)$.
[&] From $^{54}Fe(^{3}He,n\gamma)$ and $(\alpha,2n\gamma)$.
[a] Relative photon branching from each level renormalized to 100 for the strongest branching.
[b] Placement of transition in the level scheme is uncertain.

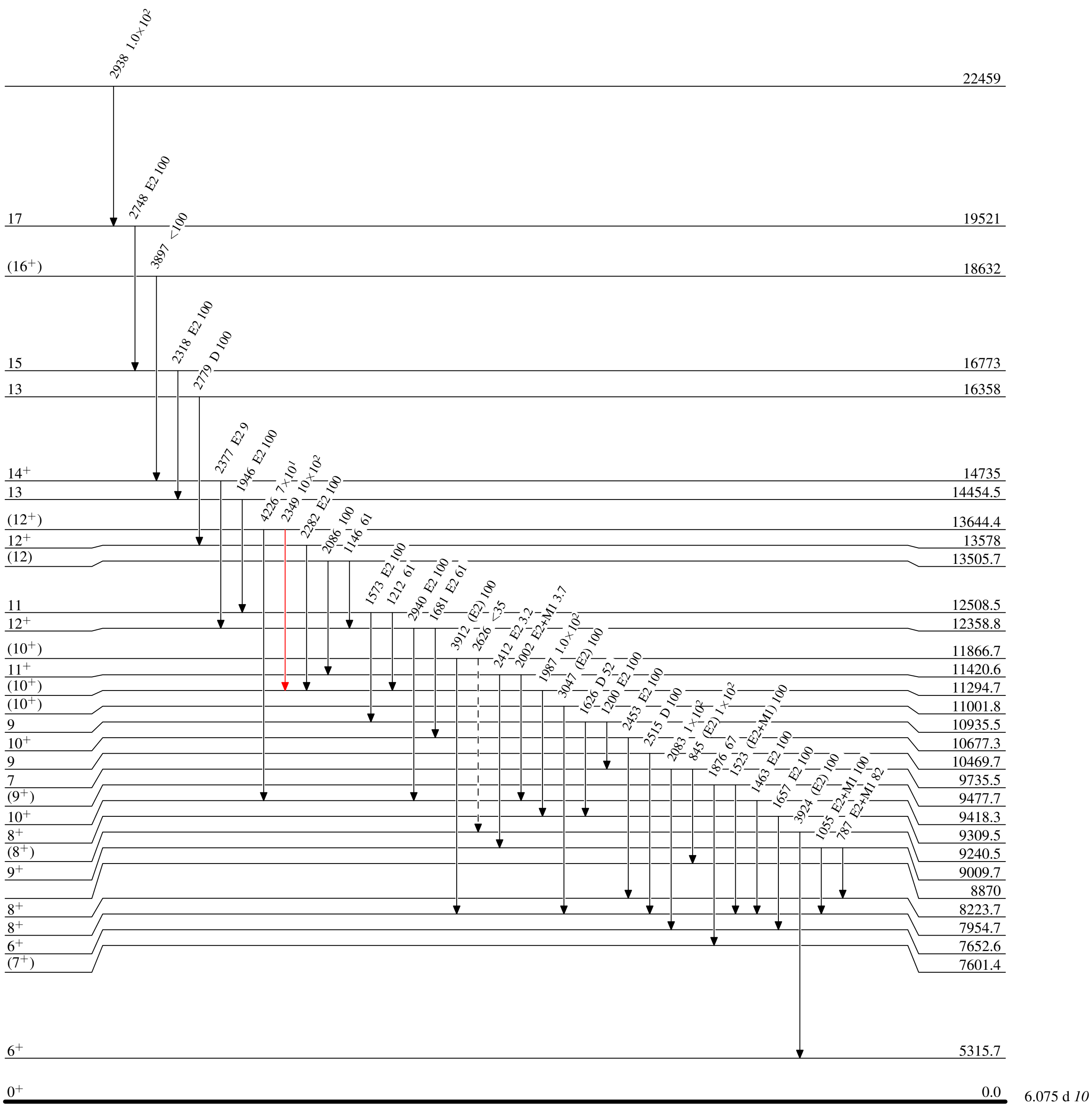
Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)

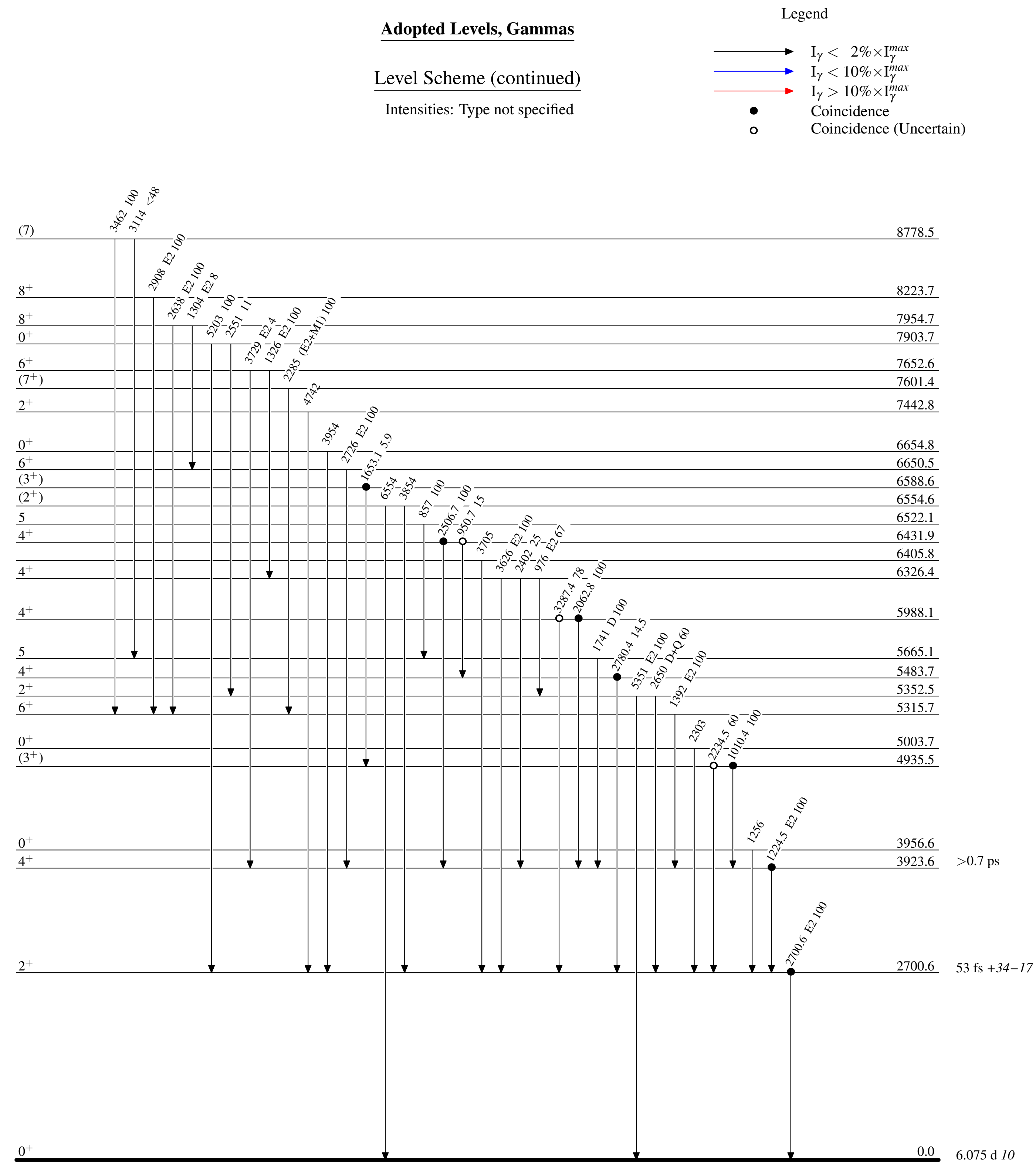


$^{56}_{28}Ni_{28}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



$^{56}_{28}Ni_{28}$

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$_{1/2}$: $>7.0\times10^{20}$ y for decay by double $\varepsilon\beta^+$ channel to the 0^+ g.s. of ^{58}Fe, and$>4.0\times10^{20}$ 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 $\approx$2 to values in 1970Le17 and 1971ChZF. Average values of τ in ps obtained are: 0.95 *3* by weighted average, normalized χ^2=2.0; 0.95 *9* by limitation of statistical weights method (the uncertainties is increased to overlap the most precise value of 0.86 *4*); 0.931 *21* by normalized residuals method (NRM), normalized χ^2=1.2; 0.926 *21* by Rajeval′s technique, normalized χ^2=1.0. The evaluators adopt 0.94 *3* as in 2008Or02; this value overlaps all the averaging methods used. 2001Ra27 evaluation (which did not include 2008Or02, 2004Yu10 and 2001Ke08) lists τ=0.904 ps *26*. μ: transient field integral perturbed angular correlation (2001Ke02). Other: −0.12 *24* (1978Ha13,1989Ra17). Q: reorientation in Coulomb excitation (1974Le13,1970Le17). See also 2005St24 compilation.
2459.21[l] *14*	4^+	3.7 ps *4*	BCDEFGH JK M OPQRST VWX	J$^\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

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
				B(E2) In (e,e′) is In disagreement. J^{π}: L(α,α')=2.
2902.15 *21*	1^+[h]	69 fs +*15*−*14*	A H N PQ t	Configuration=$\nu(p_{3/2}f_{5/2})$ ((p,p′),1986Ho15).
2942.56 *18*	0^+	1.46 ns *14*	A H NOPQ St W	$T_{1/2}$: from $\gamma\gamma$(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. J^{π}: E0 transition to g.s..
3037.86 *16*	2^+	57 fs *8*	AB H NOPQRST VW	J^{π}: 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	J^{π}: 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	J^{π}: L(p,p′)=2+4 gives 3^+ uniquely.
3450.9 *5*		>11[@] fs	N	
3524 *5*	4^+		I R T	J^{π}: L(α,α')=4.
3531.1 *3*	0^+	0.19 ps *6*	A H KL OPQ	J^{π}: 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	J^{π}: 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	J^{π}: L(α,α')=4; ΔJ=2, E2 γ to 2^+.
3775.0 *3*	3^+	0.28 ps +*14*−*7*	K PQ T W	J^{π}: L(p,p′)=2+4 gives 3^+ uniquely.
3870			R	
3898.8 *4*	2^+	23 fs *6*	AB H K NOPQR T W	J^{π}: 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	J^{π}: 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	J^{π}: 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 J^{π}'s are different. J^{π}: L(^{3}He,n)=2.
4294.7 *4*	4^+	24 fs +*22*−*18*	C K OPQ W	J^{π}: 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	J^{π}: γ's to 2^+ and 4^+.
4383.0[q] *3*	(5^+)		CDEFG M Q T	J^{π}: ΔJ=1, (M1+E2) γ to 4^+.
4404.3 *4*	4^+	43 fs +*17*−*14*	C PQ T W	J^{π}: L(α,α')=4.
4449.6 *4*	$1^+,2^+$		A QR T	J^{π}: 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)[†]	J^{π}[‡]	$T_{1/2}$[#]	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). J^{π}: 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	J^{π}: 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	J^{π}: 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	J^{π}: 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	J^{π}: L(p,p′)=4.
5452.2 *4*	1[i]	>13[@] fs	N Q	
5472.3 *8*	4^+		Q W	J^{π}: 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	J^{π}: L(α,α′)=4+5 for a doublet; γ from 7^-; L(^{6}Li,d)=(5,6).
5590.3 *10*	2^+		Q ST W	J^{π}: 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	J^{π}: ΔJ=2, Q γ to 4^+.
5748.5 *8*	2^+		Q	J^{π}: L(p,p′)=2.
5766.3 *8*	4^+		Q	J^{π}: 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	J^{π}: 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	J^{π}: L(α,α′)=1; J=1 from (γ,γ′); $J^{\pi}=2^+$ 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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Adopted Levels, Gammas (continued)

^{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	

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
7937 *25*	8^-[a]		H O	
7973.6 *6*	(8^+)		C	J^{π}: ΔJ=2 γ to (6^+); ΔJ=1, D+Q γ to 7^+.
7982.8 *6*	(8^-)		C	J^{π}: 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	J^{π}: 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	J^{π}: γ to 0^+.
8115.1 *6*	(8^-)		C	J^{π}: γ to 7^-.
8120.8[r] *5*	(9^+)		C E	J^{π}: ΔJ=1, D+Q γ's to (8^+).
8134 *5*	3^-		Q	J^{π}: 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	J^{π}: 1^+ suggested in (e,e′) is in disagreement, if the level is the same as in (γ,γ′).
8276 *8*	1^+[ag]		O Q	J^{π}: 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=$\nu(f_{7/2}^{-1}f_{5/2})$ ((p,p′),1986Ho15).
8461.0 *7*	1^+[gi]	0.51[@] fs *3*	N Q	
8475 *8*	2^-[a]		O	
8493 *15*	$(3^-,1^-)$		T	J^{π}: L=(3,1) in (α,α′).
8514.1 *4*	1^-[i]	0.66[@] fs *5*	NO Q	J^{π}: 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	J^{π}: 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′). J^{π}: 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	J^{π}: ΔJ=1, (M1+E2) γ to (8^-); γ to 7^-.
8780 *8*	2^-[a]		O	
8797 *5*	3^-		Q	J^{π}: L(p,p′)=3.
8808 *25*	8^-[a]		O	
8817 *8*	(1^+)[a]		O	J^{π}: 1^+,(2^-) In (e,e′).
8830 *40*	2^+		W	J^{π}: L(p,t)=2.
8845 *5*	3^-		O Q	J^{π}: 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	J^{π}: γ to (8^+) suggests $(8,9,10^+)$.
8902 *5*	4^+		J Q	J^{π}: L(p,p′)=4.
8934.6 *5*	$1^{(-)}$[i]	0.310[@] fs *11*	NO	J^{π}: parity from (e,e′).
8961.3 *7*	1^+[agi]	1.20[@] fs *13*	NO Q	
9012 *5*	3^-		Q	J^{π}: L(p,p′)=3.
9027.2 *7*	(9^-)		C	J^{π}: ΔJ=2 γ to 7^-; γ to (8^-).
9037 *8*	(1^+)[a]		O	J^{π}: 1^+,(2^-) In (e,e′).
9062.7[r] *6*	(10^+)		C	J^{π}: 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)[†]	Jπ[‡]	XREF	Comments
10073 *10*	1^+[a]	O	
10107 *10*	1^+[ag]	O Q	
10120 *5*	4^+	K Q	XREF: K(10100). Jπ: 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	Jπ: L(p,p′)=3. E(level): note that 10209 and 10214 are two different levels in (p,p′).
10214 *10*	1^+[a]	O Q	Jπ: 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	Jπ: 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	Jπ: L(p,p′)=4.
10385 *10*	(1^+)[a]	O	Jπ: 1^+,(2^-) In (e,e′).
10394.1 *13*	(10^+)	C	
10404.8 *7*	(9^-)	C	
10434 *10*	(2^+)[a]	O Q	Jπ: 2^+,(1^-) In (e,e′).
10460 *5*	4^+	Q	Jπ: 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	Jπ: L(p,p′)=4.
10550 *10*	$(1^+,2^-)$[a]	O	
10582 *10*	(1^+)[a]	O	Jπ: 1^+,(2^-) In (e,e′).
10586 *5*	3^-	Q	Jπ: L(p,p′)=3.
10590 *50*	0^+	L	Jπ: L(^{3}He,n)=0.
10590.9 *6*	(11^-)	C	
10630 *40*	4^+	W	Jπ: L(p,t)=4.
10633 *10*	1^+[a]	O	
10638 *5*	3^-	Q	Jπ: 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	Jπ: L(p,p′)=4.
10781.7 *9*	(11^+)	C	
10805 *10*	$1^+,2^-$[a]	O Q	
10823 *5*	4^+	Q	Jπ: L(p,p′)=4.
10856 *10*	$(1^-,2^+)$[a]	O	
10882.0 *14*	(11^+)	C	
10891 *10*	2^+[a]	O	
10902 *5*	4^+	Q	Jπ: L(p,p′)=4.
10950 *10*	1^+[a]	O	
10967 *5*	4^+	K Q	XREF: K(10950). Jπ: 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). Jπ: (2^+) In (e,e′).

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
11080 *10*	(1^+)[a]	O	J^{π}: $1^+,(2^-)$ 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′). J^{π}: L(p,p′)=3; $2^+,3^-$ In (e,e′).
11165 *10*	1^+	Q	J^{π}: from 0° data in (p,p′) (2007Fu04) In (p,p′).
11203 *5*	4^+	Q	J^{π}: L(p,p′)=4.
11240 *25*	8^-[a]	O	
11255.2[p] *7*	(11^-)	C	
11266 *10*	(1^+)[a]	O Q	J^{π}: $1^+,(2^-)$ In (e,e′).
11297 *10*	2^+[a]	O	
11297.7 *7*	(12^-)	C	
11300 *5*	4^+	Q	J^{π}: L(p,p′)=4.
11335 *10*	$1^-,2^+$[a]	O Q	
11363 *10*	(2^-)[a]	O	J^{π}: $2^-,(1^+)$ In (e,e′).
11410 *10*	$(2^+,3^-)$[a]	O	
11413.1 *9*	(11^+)	C	
11434 *5*	4^+	Q	J^{π}: L(p,p′)=4.
11450 *25*	(6^+)[a]	O	
11470 *10*	(2^-)[a]	O	J^{π}: $2^-,(1^+)$ In (e,e′).
11474.5[r] *7*	(12^+)	C	
11497 *10*	(3^-)	Q W	J^{π}: L(p,t)=(3).
11536 *10*	(2^-)[a]	O	J^{π}: $2^-,(1^+)$ 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	J^{π}: 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	J^{π}: L(p,t)=(3).
11860 *10*	1^+[a]	O	
11887 *10*	1^+[a]	O Q	J^{π}: 1^+ In (p,p′) (2007Fu04); $2^-,(1^+)$ in (e,e′).
11933 *10*	$(3^-,4^+)$[a]	O	
11990 *10*	(1^+)[a]	O	J^{π}: $1^+,(2^-)$ 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	J^{π}: (2^+) In (e,e′).
12249 *10*		O	
12283 *10*	(1)[g]	O Q	J^{π}: (1^-) In (e,e′).
12330 *10*	(2^-)[a]	O	J^{π}: $2^-,(1^+)$ In (e,e′).
12356.8 *9*	(12^-)	C	
12364.6 *7*	(12^+)	C	
12386 *10*	(1^+)[g]	O Q	J^{π}: (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

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
				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	Jπ: $2^+,(4^+)$ In (e,e′).
12700 *10*	(2^-)[a]		O	Jπ: $2^-,(1^+)$ In (e,e′).
12719.2 *7*	(12^+)		C	
12744 *10*	$(1^+,2^+)$[g]		O Q	Jπ: (2^+) In (e,e′).
12796 *10*	(1^+)[a]		O	Jπ: $1^+,(2^-)$ 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	Jπ: 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	Jπ: $1^+,(2^-)$ 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	Jπ: (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	Jπ: $2^+,(1^-)$ In (e,e′).
13590 *10*	$(1^+,2^-)$[a]		O	
13606.8[w] *13*	(12^+)		C	
13632 *4*			C	Jπ: 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	Jπ: $1^+,(2^-)$ In (e,e′).
13814 *10*	2^+[a]		O	
13850.1[p] *10*	(14^-)		C	
13884.2 *17*	(13^+)		C	
13902 *10*	(2^+)		O	Jπ: $2^+,(3^-)$ In (e,e′).
13929 *10*	(2^+)[a]		O	
13943 *3*			C	Jπ: 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	Jπ: $1^+,(2^-)$ In (e,e′).
14213 *10*	(2^+)[a]		O	

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Adopted Levels, Gammas (continued)

^{58}Ni Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	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	Jπ: $2^+,(3^-)$ In (e,e′).
14455.8[n] *16*	(13^+)		C	
14470 *40*	(0^+)		W	Jπ: L(p,t)=(0).
14504 *10*	2^+[a]		O	
14542 *10*	(2^+)[a]		O	Jπ: $2^+,(1^-,3^-)$ 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	Jπ: $1^+,(2^-)$ 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	Jπ: 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	Jπ: 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	Jπ: 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	Jπ: 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=?

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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)[†]	J^{π}[‡]	$T_{1/2}$[#]	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	
18.43×10^3 *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	J^{π}: 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	
24.03×10^3 *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	
31.13×10^3 *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 $\Gamma(0)/\Gamma=1$ 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 $\sigma(\theta)$ and analyzing power data in (pol,P').

[i] From $\gamma(\theta)$ 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.

Adopted Levels, Gammas (continued)

$\gamma(^{58}$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.: ΔJ=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_k^2(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^+					

$^{58}_{28}$Ni$_{30}$-17

$\gamma(^{58}Ni)$ (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′γ).
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

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

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	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 ($^{36}Ar,\alpha 2p\gamma$). Other: −2.5 *+6−8* or −0.20 *+10−15* in ($^{12}C,2n\gamma$).
		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^+			

From ENSDF

$^{58}_{28}Ni_{30}$-19

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
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		

From ENSDF

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

Adopted Levels, Gammas (continued)

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

E$_i$(level)	J$^\pi_i$	E$_\gamma$[‡]	I$_\gamma$[‡]	E$_f$	J$^\pi_f$	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

Adopted Levels, Gammas (continued)

γ(^{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^+)			

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

E_i(level)	J_i^π	E_γ‡	I_γ‡	E_f	J_f^π	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_γ: 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)

γ(^{58}Ni) (continued)

E_i(level)	J_i^{π}	E_{γ}‡	I_{γ}‡	E_f	J_f^{π}	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

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

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[†]
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$^+$)		

$^{58}_{28}Ni_{30}$-26

$\gamma(^{58}Ni)$ (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⁺)		

$^{58}_{28}Ni_{30}$-27

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

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

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†
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$^-$)		

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.

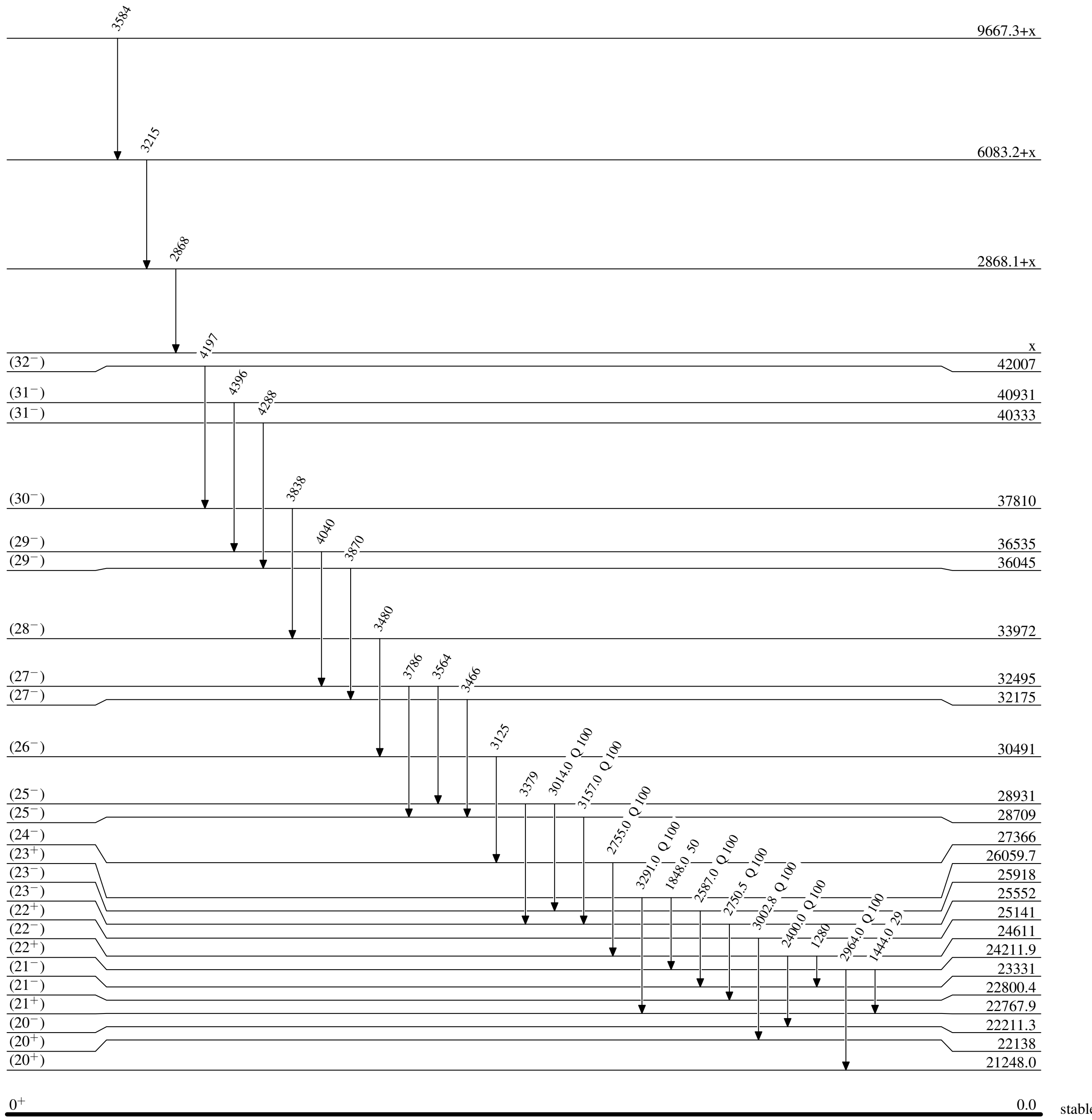
& Multiply placed with intensity suitably divided.

^{a} Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

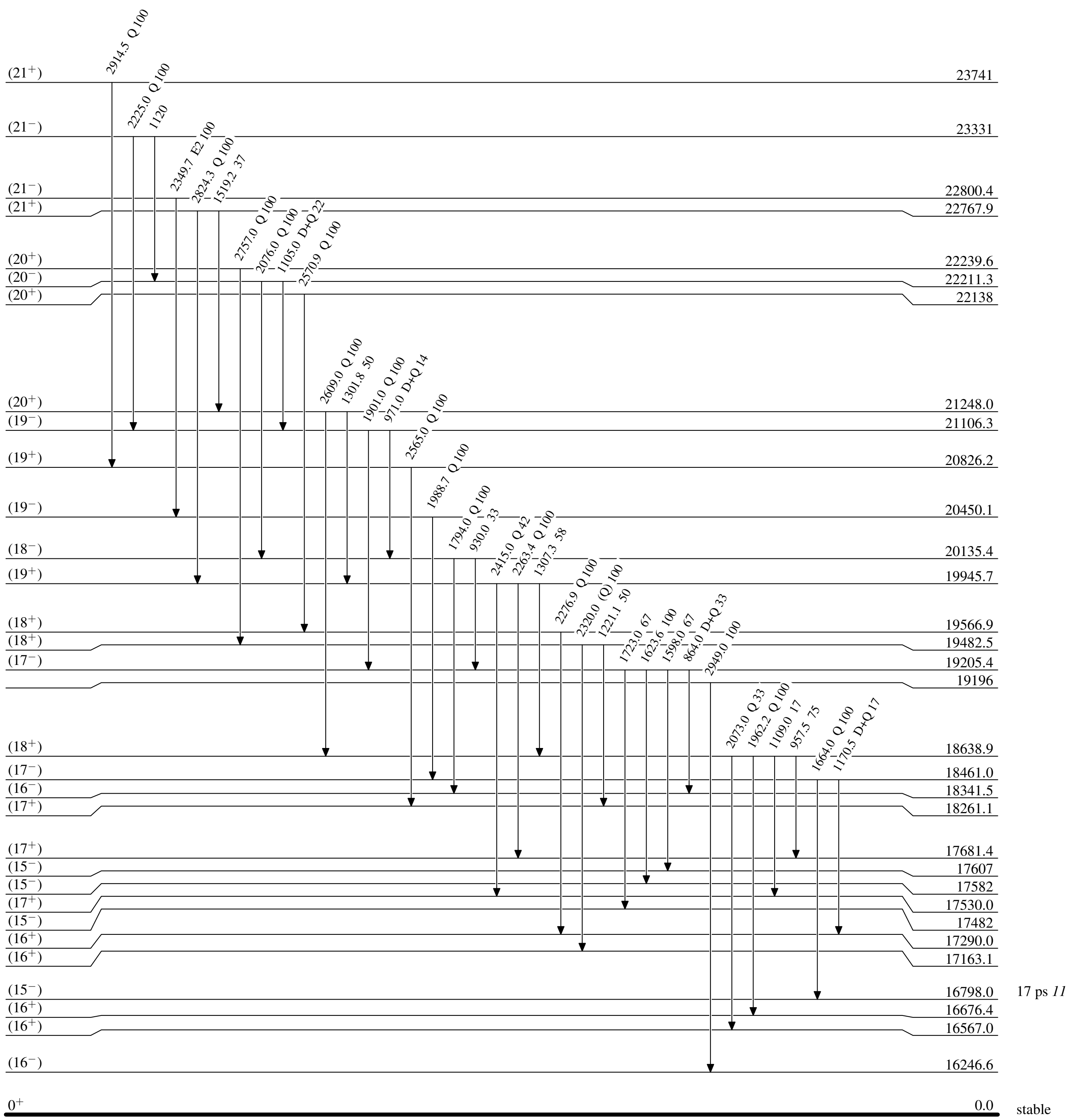


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

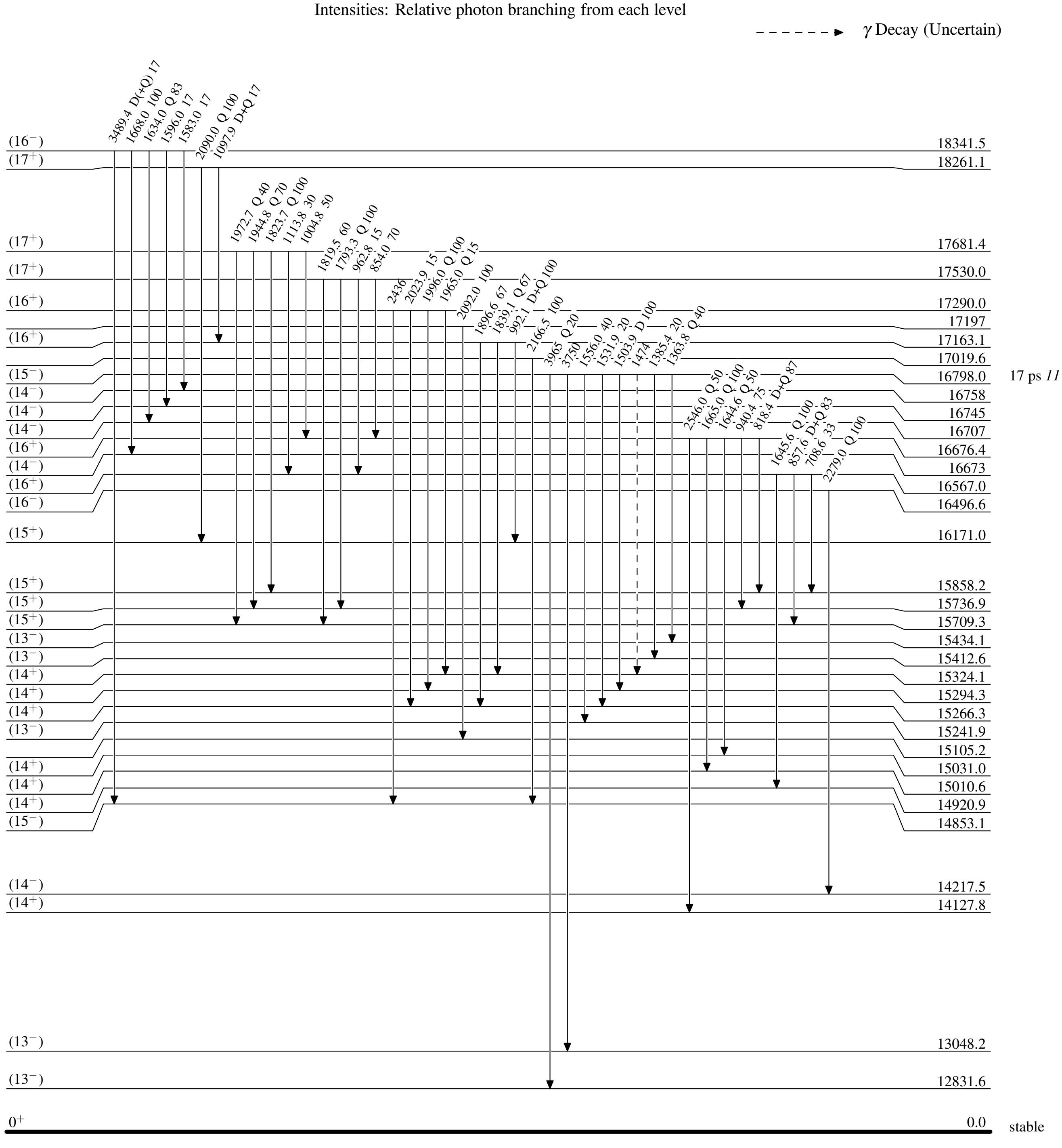


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



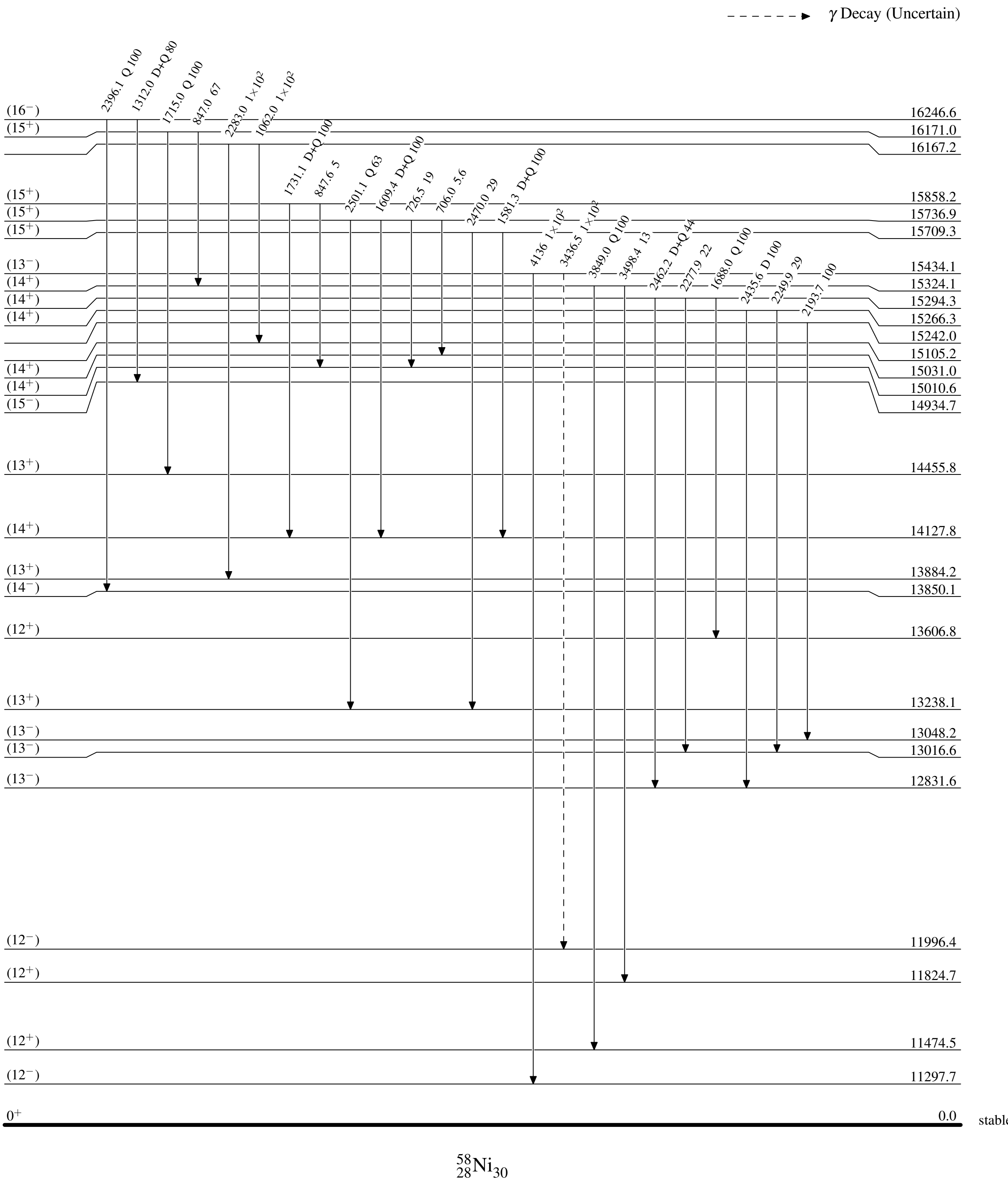
$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

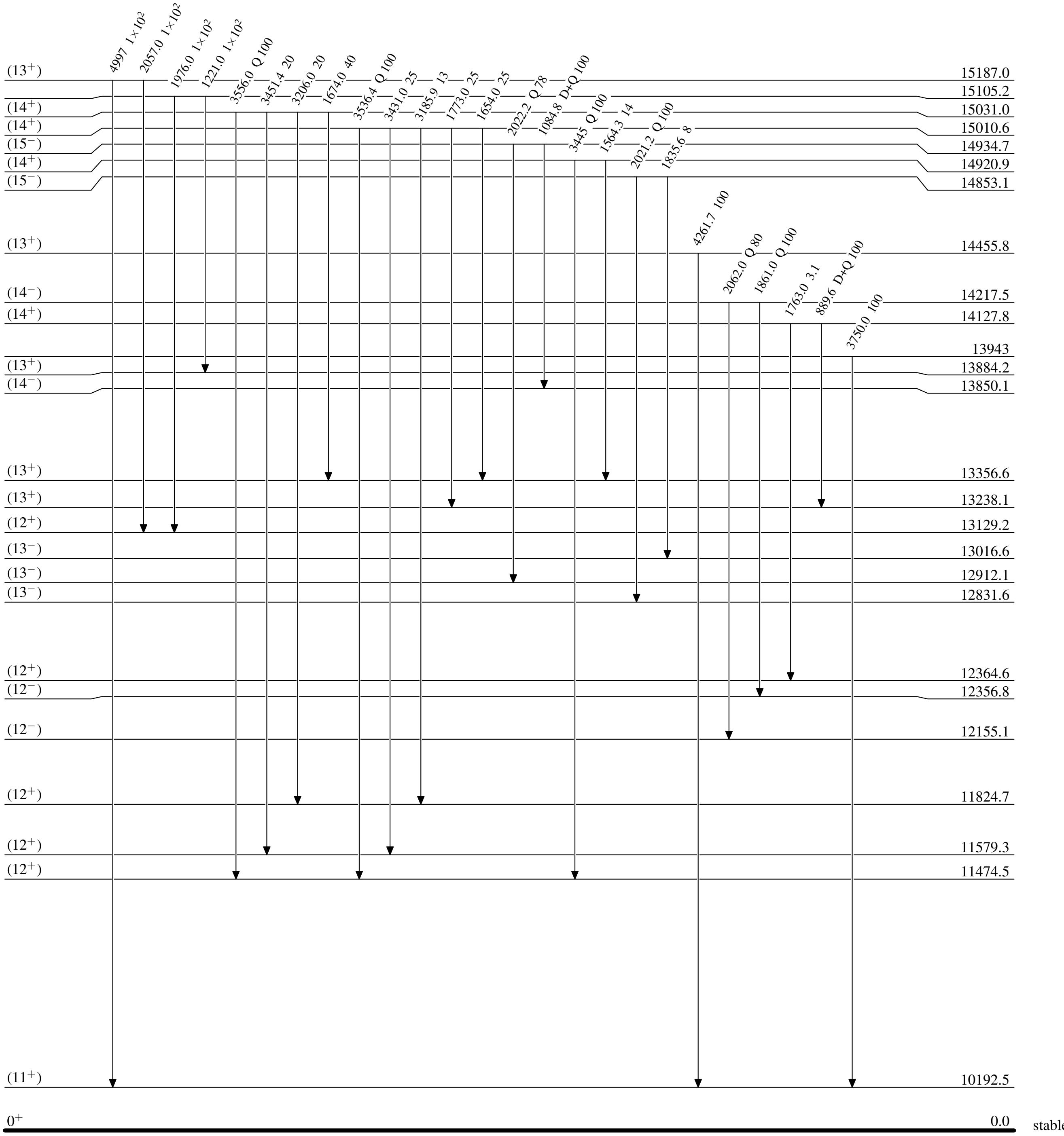
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

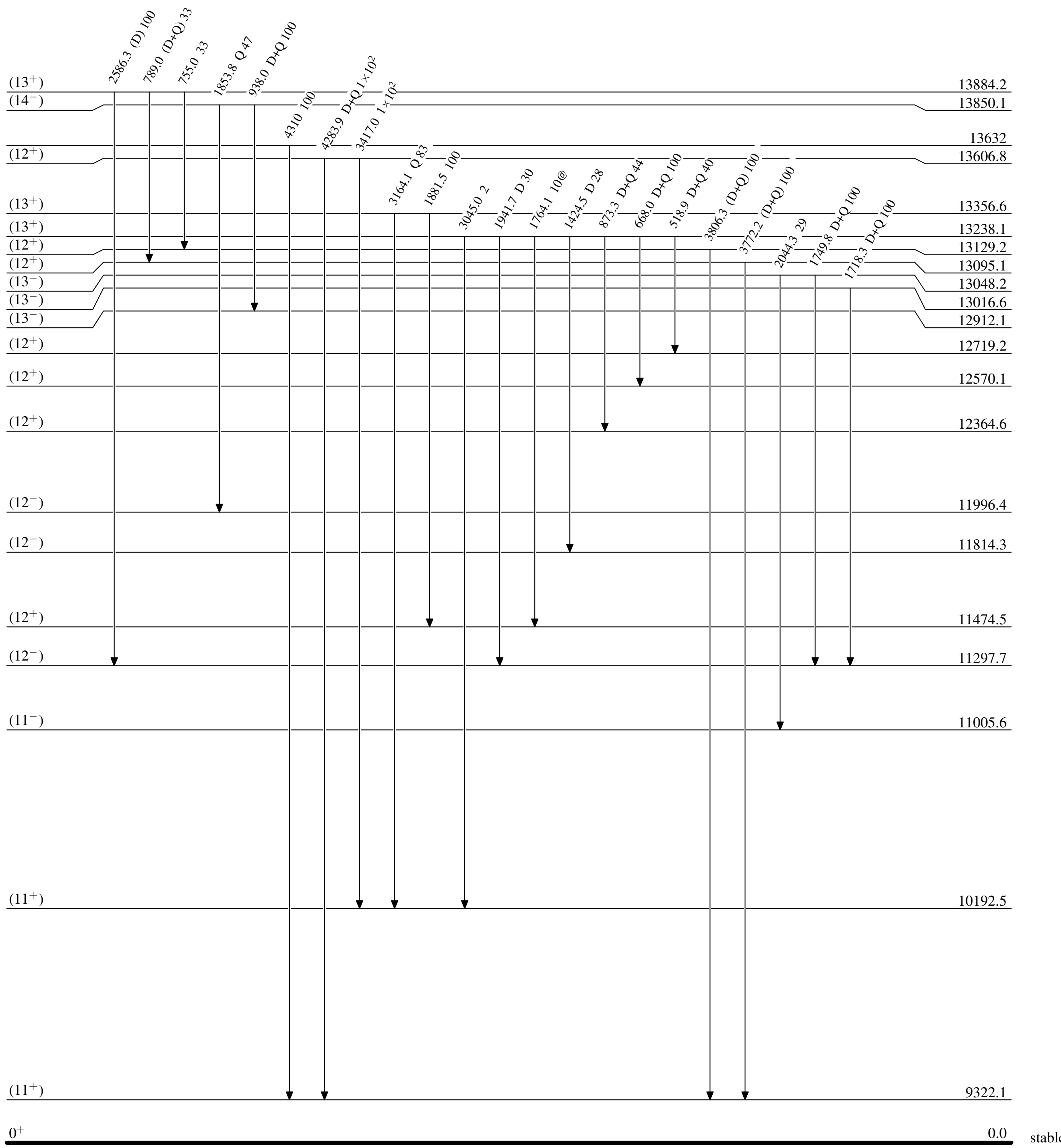


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

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



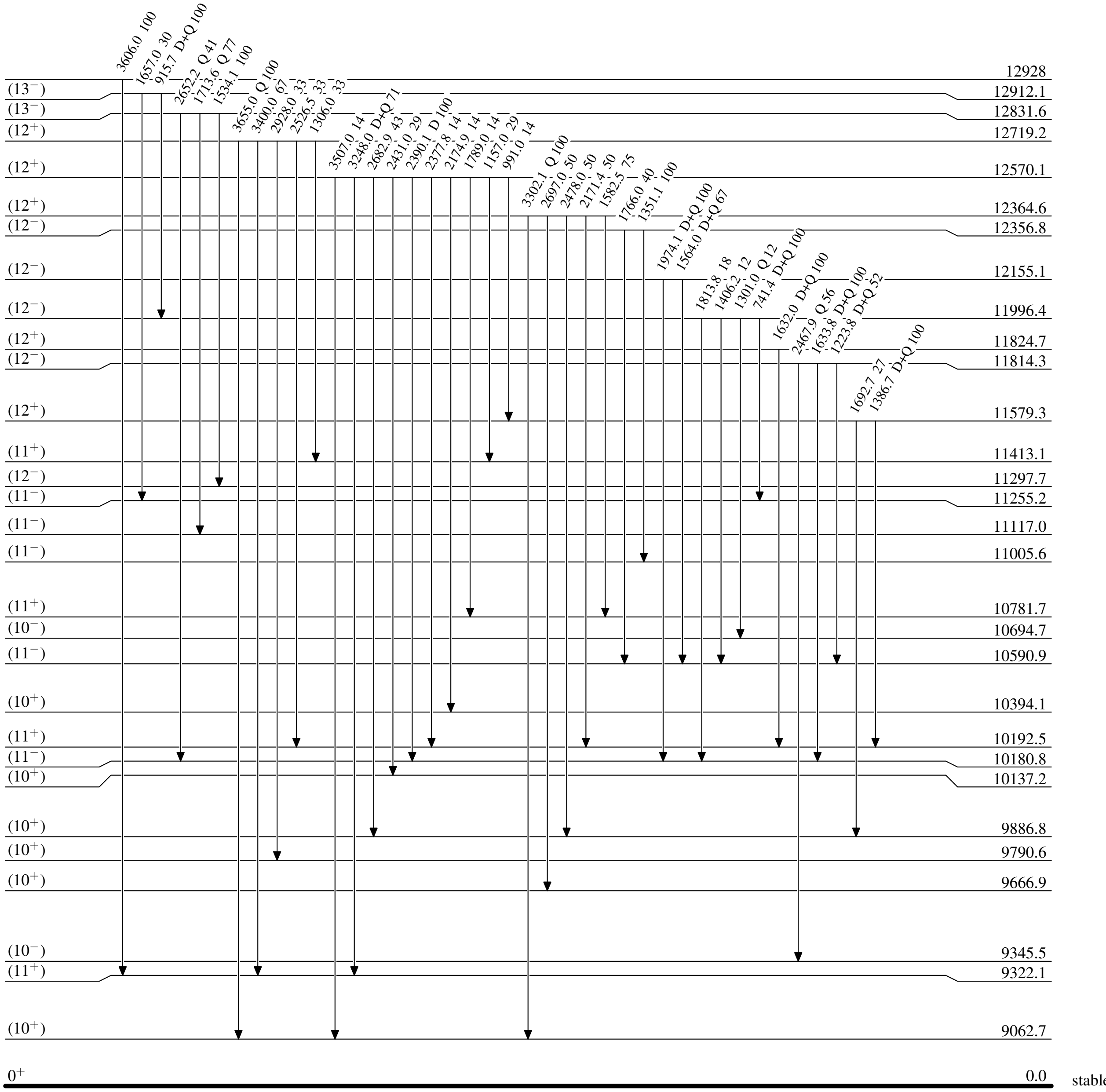
$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

@ Multiply placed: intensity suitably divided

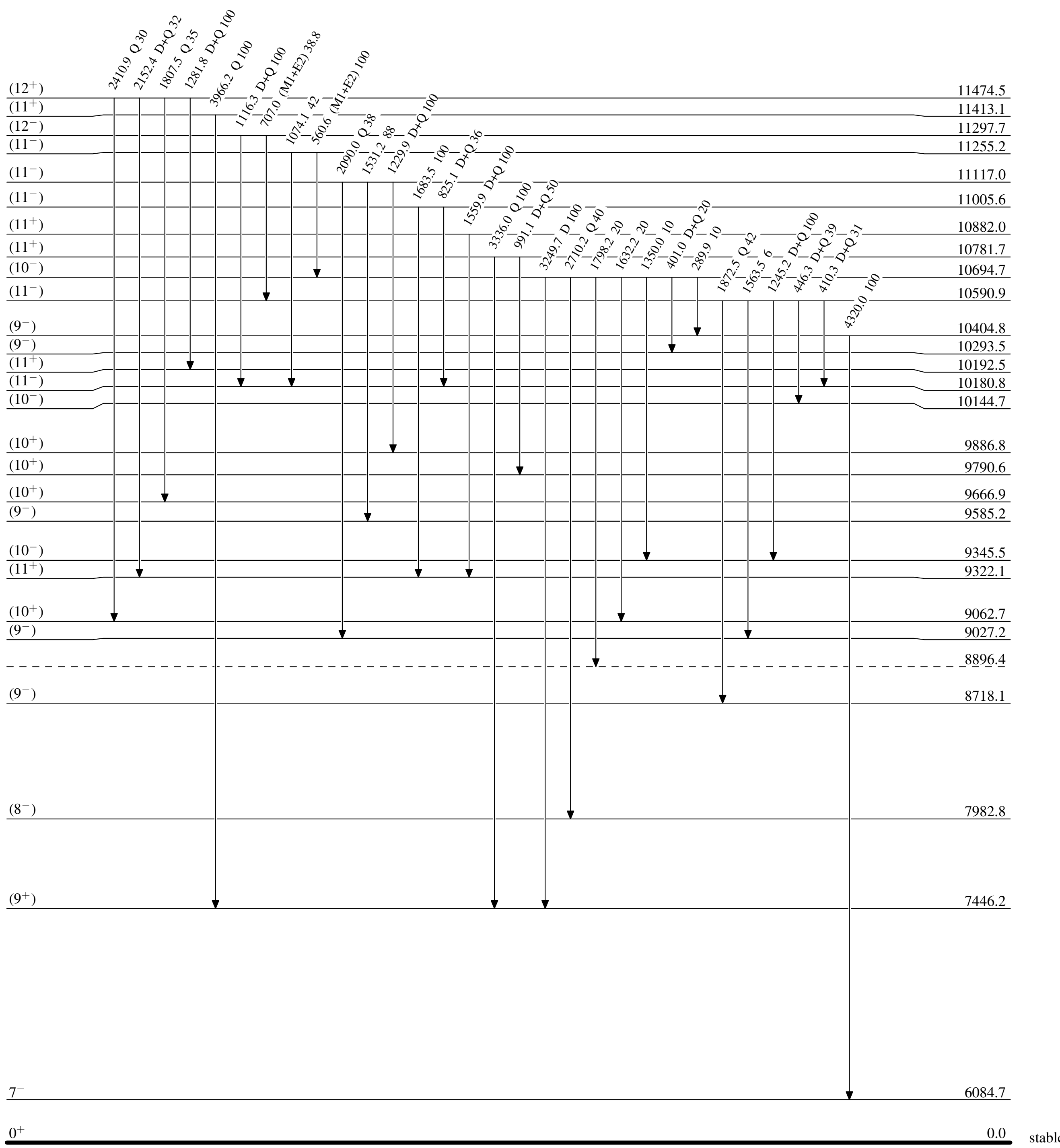


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

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

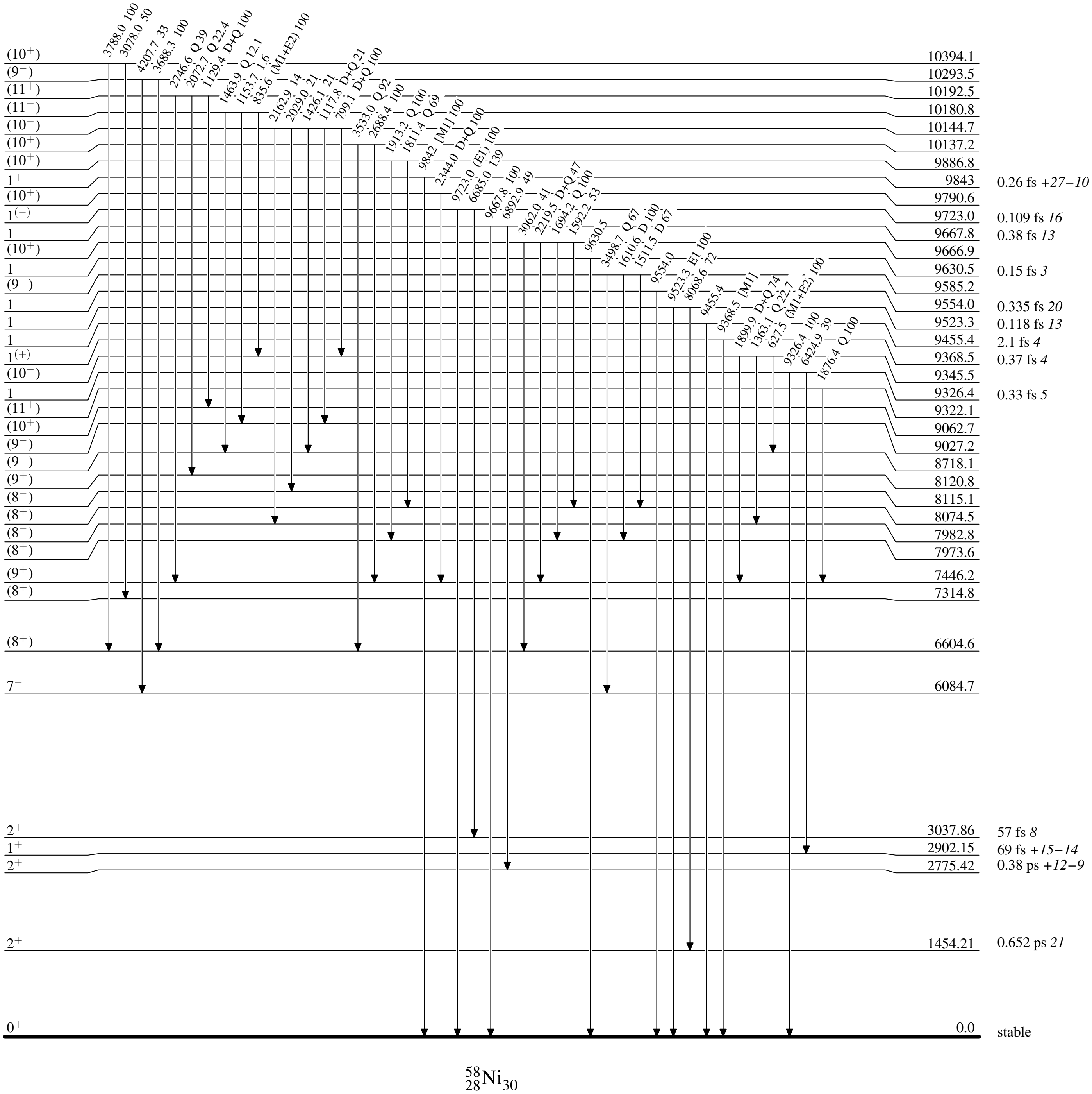


$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas

Level Scheme (continued)

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



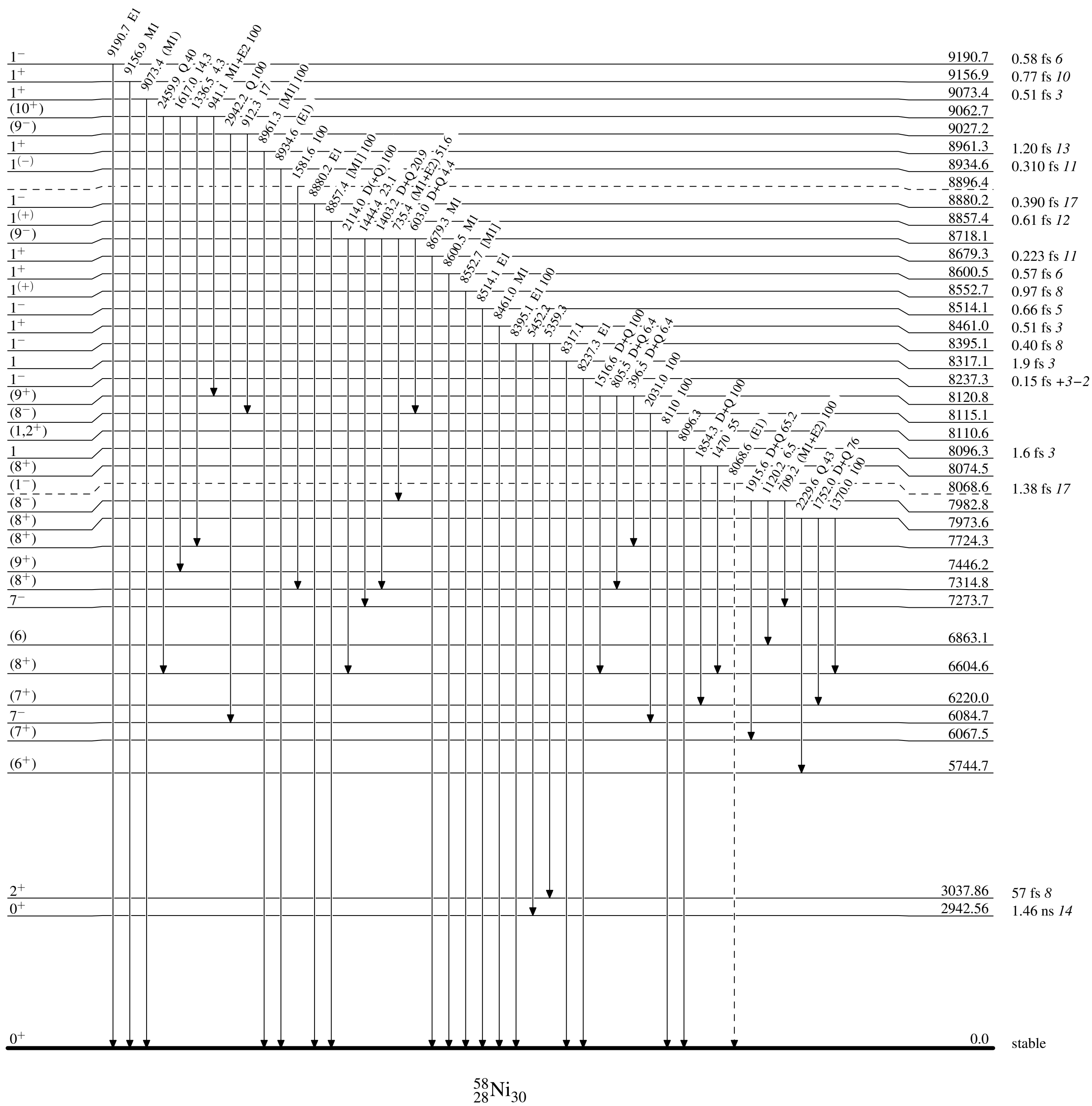
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)



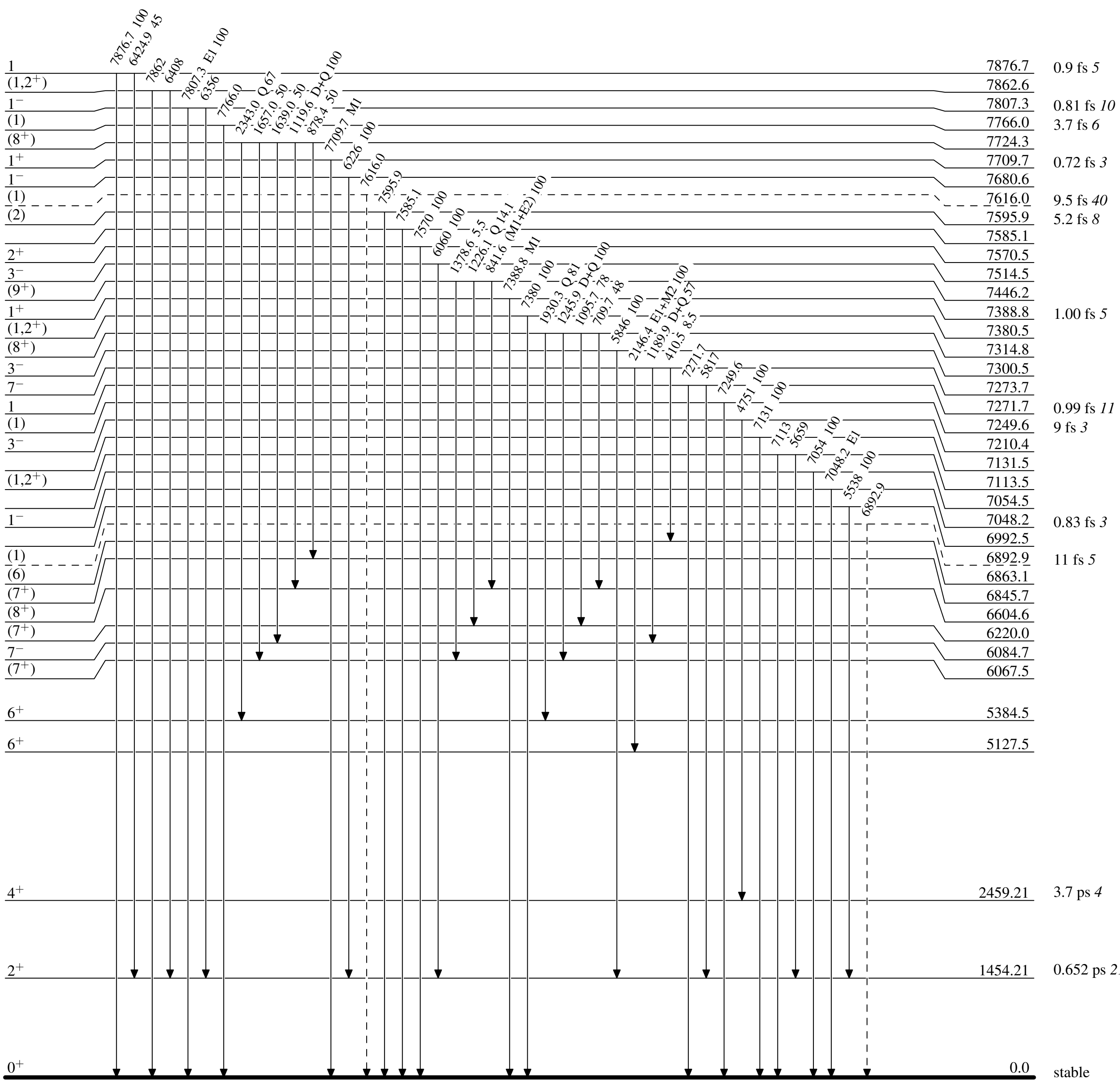
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

- - - - - -► γ Decay (Uncertain)



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

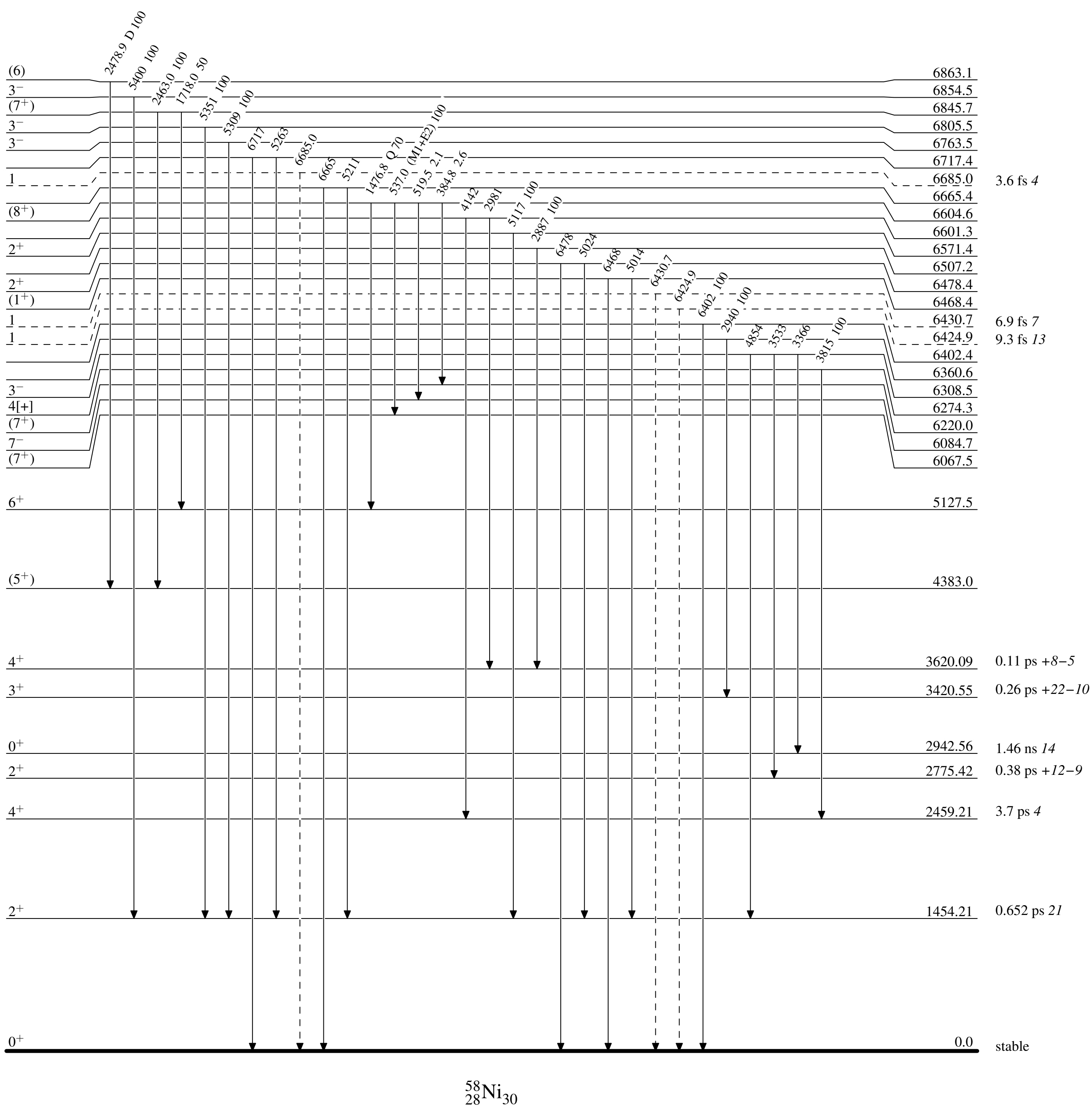
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

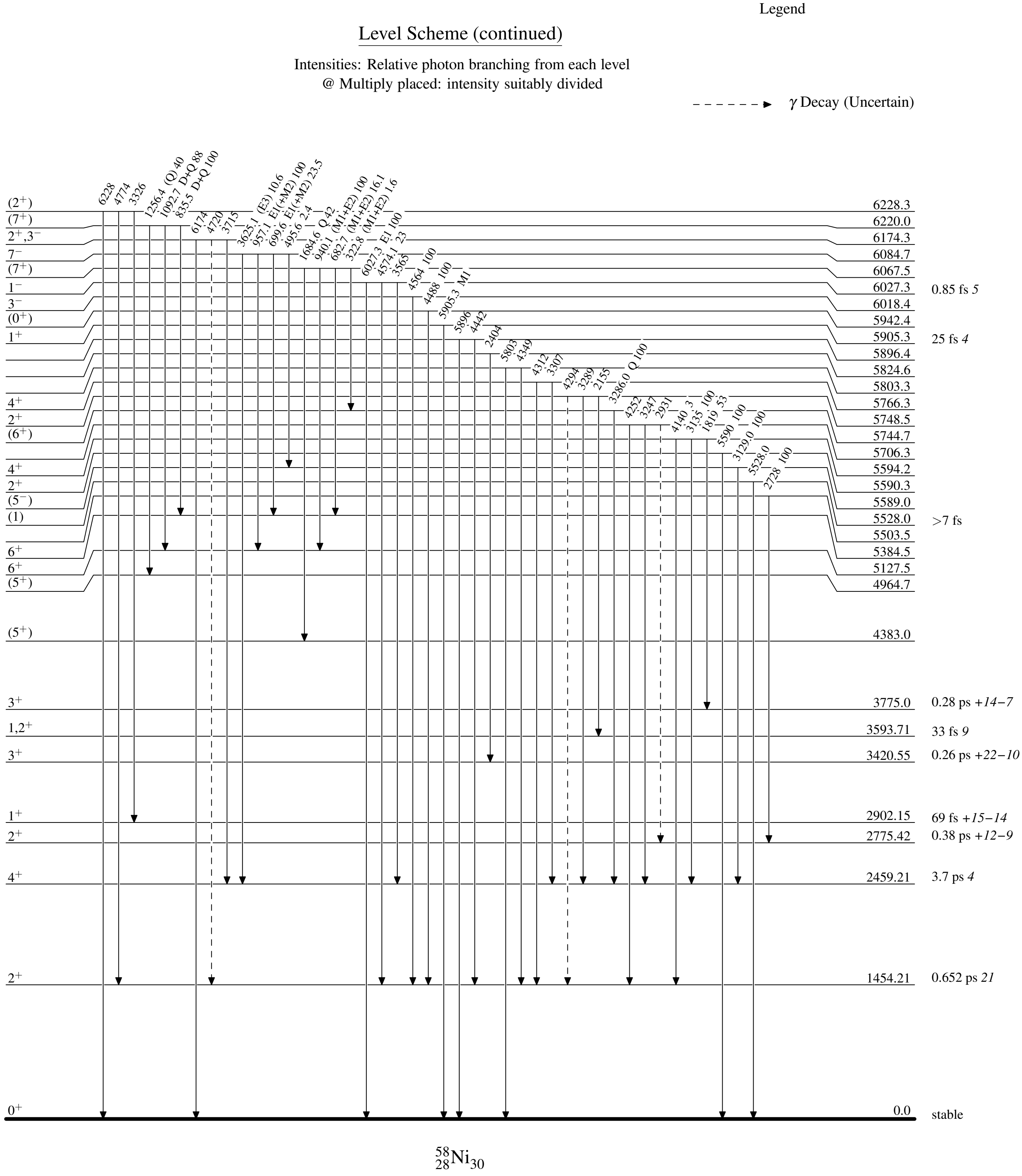
γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

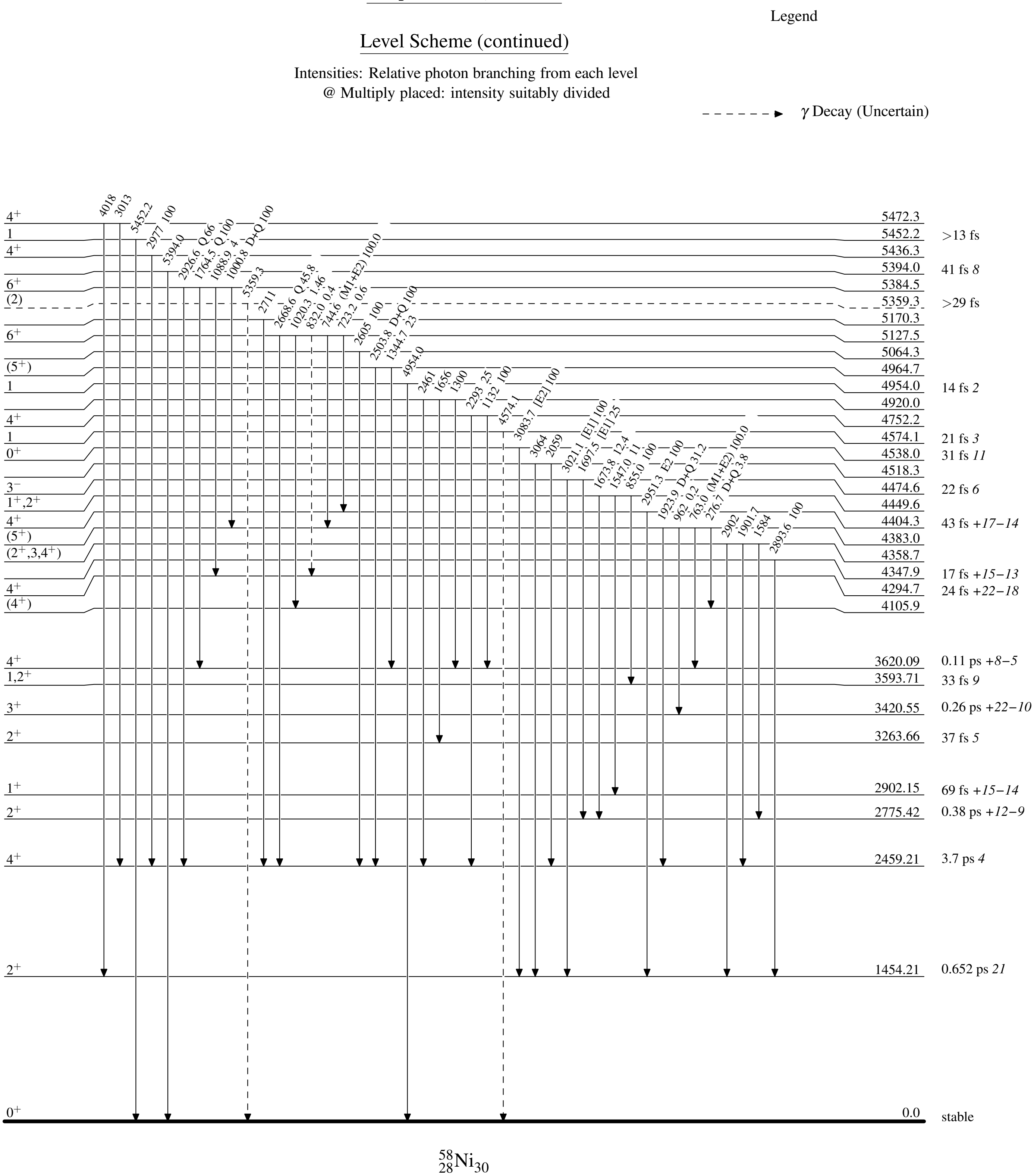
Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided



Adopted Levels, Gammas

Level Scheme (continued)

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



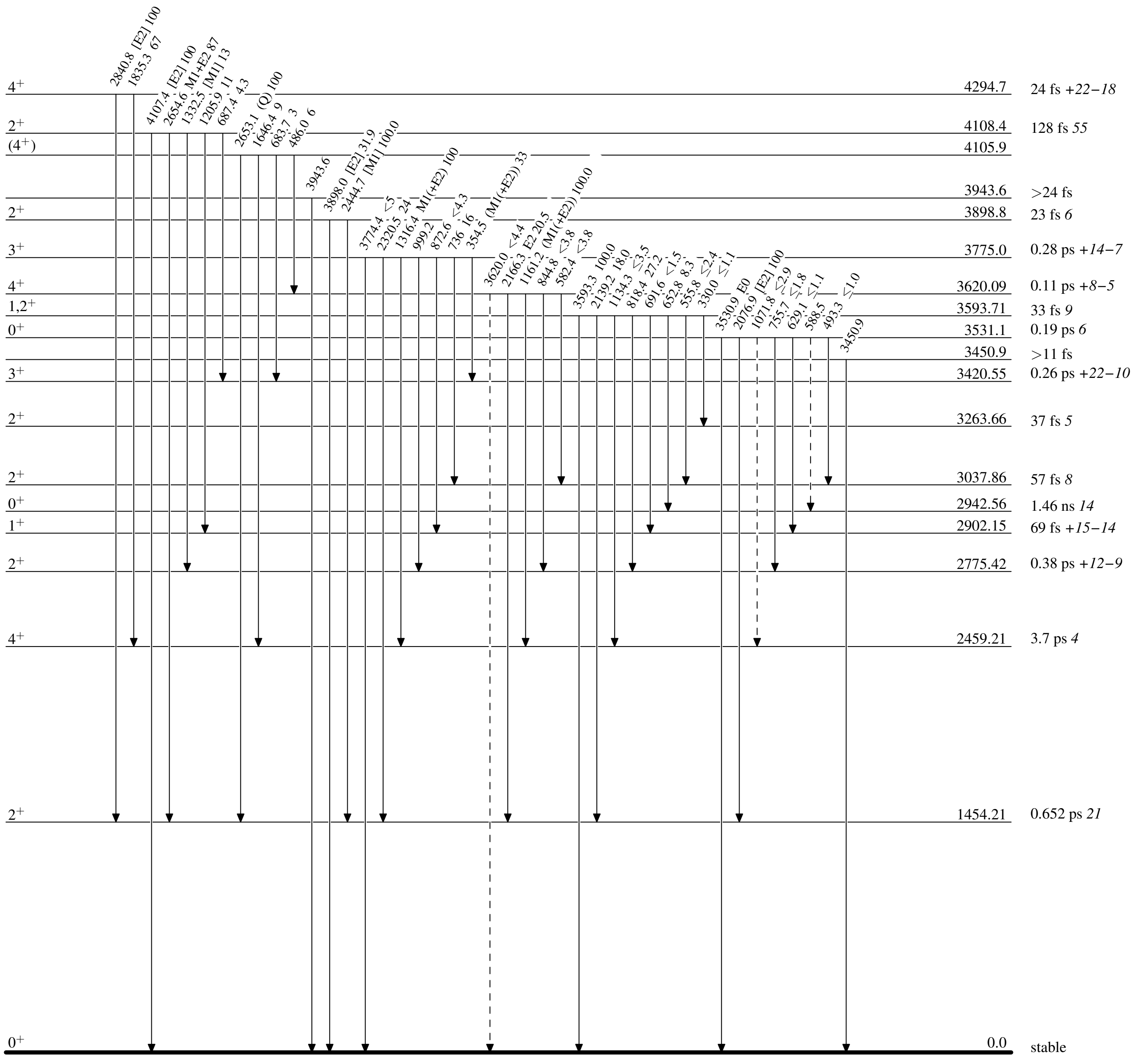
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)



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

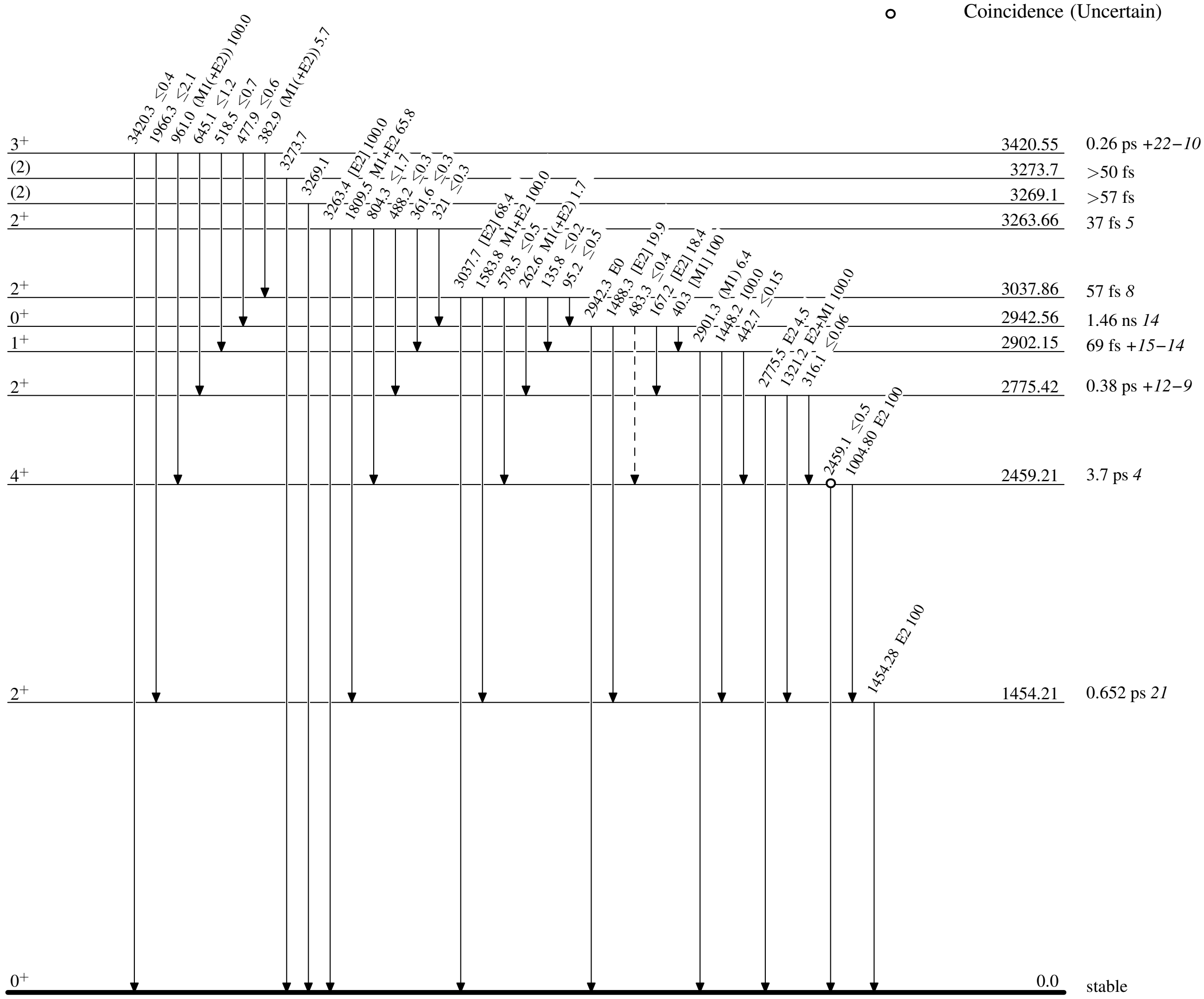
Adopted Levels, Gammas

Legend

Level Scheme (continued)

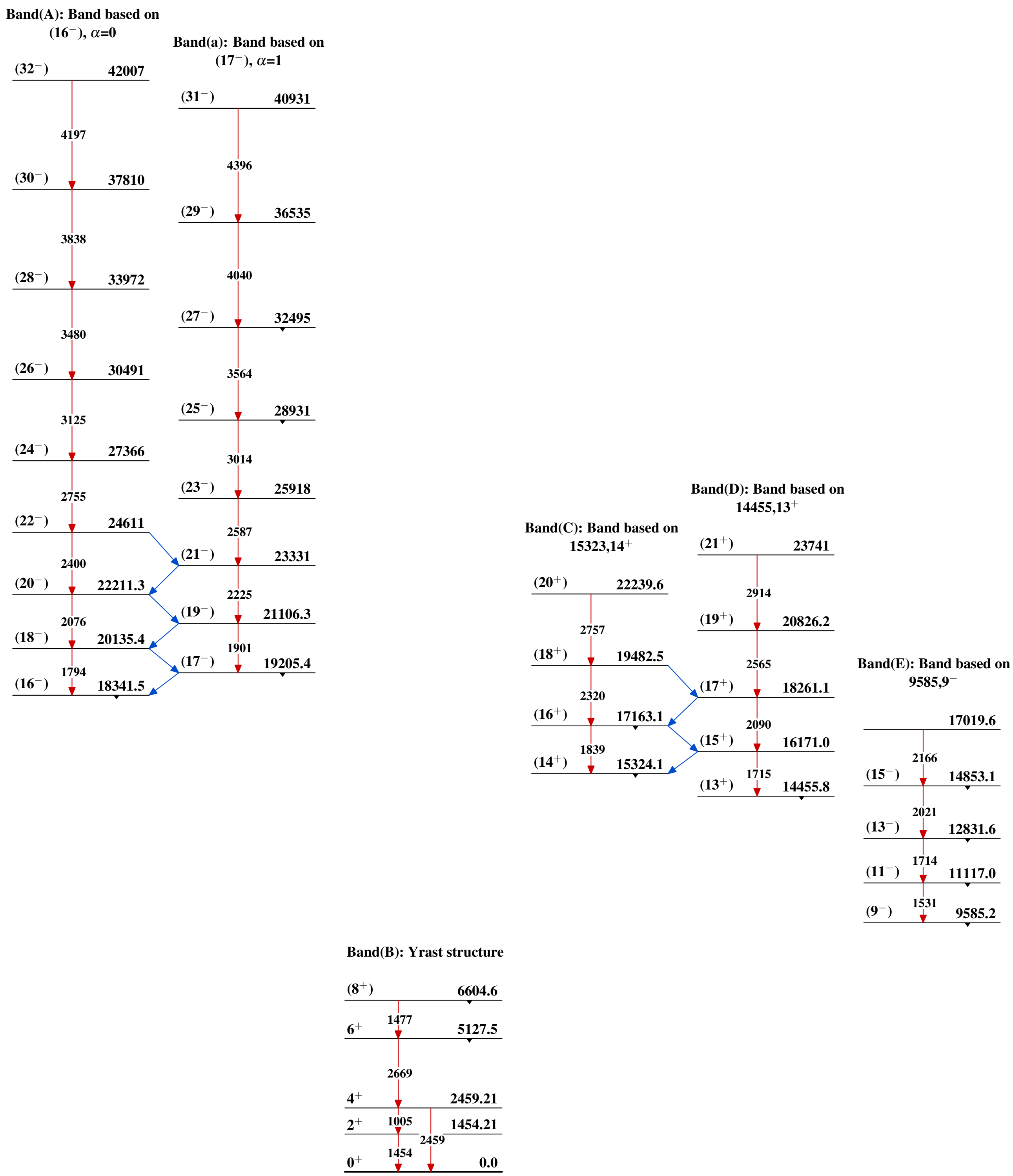
Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

γ Decay (Uncertain)
Coincidence
Coincidence (Uncertain)



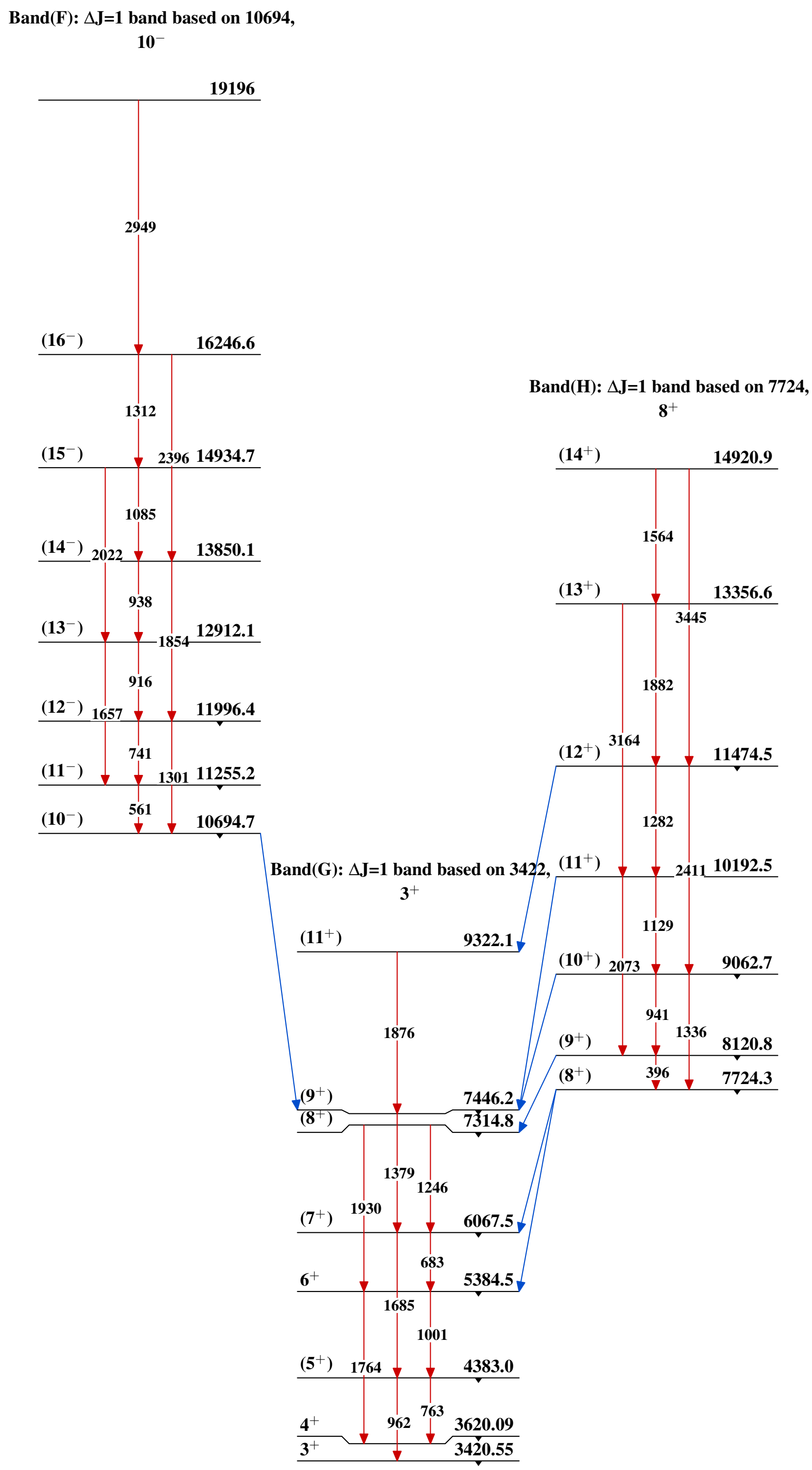
$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas



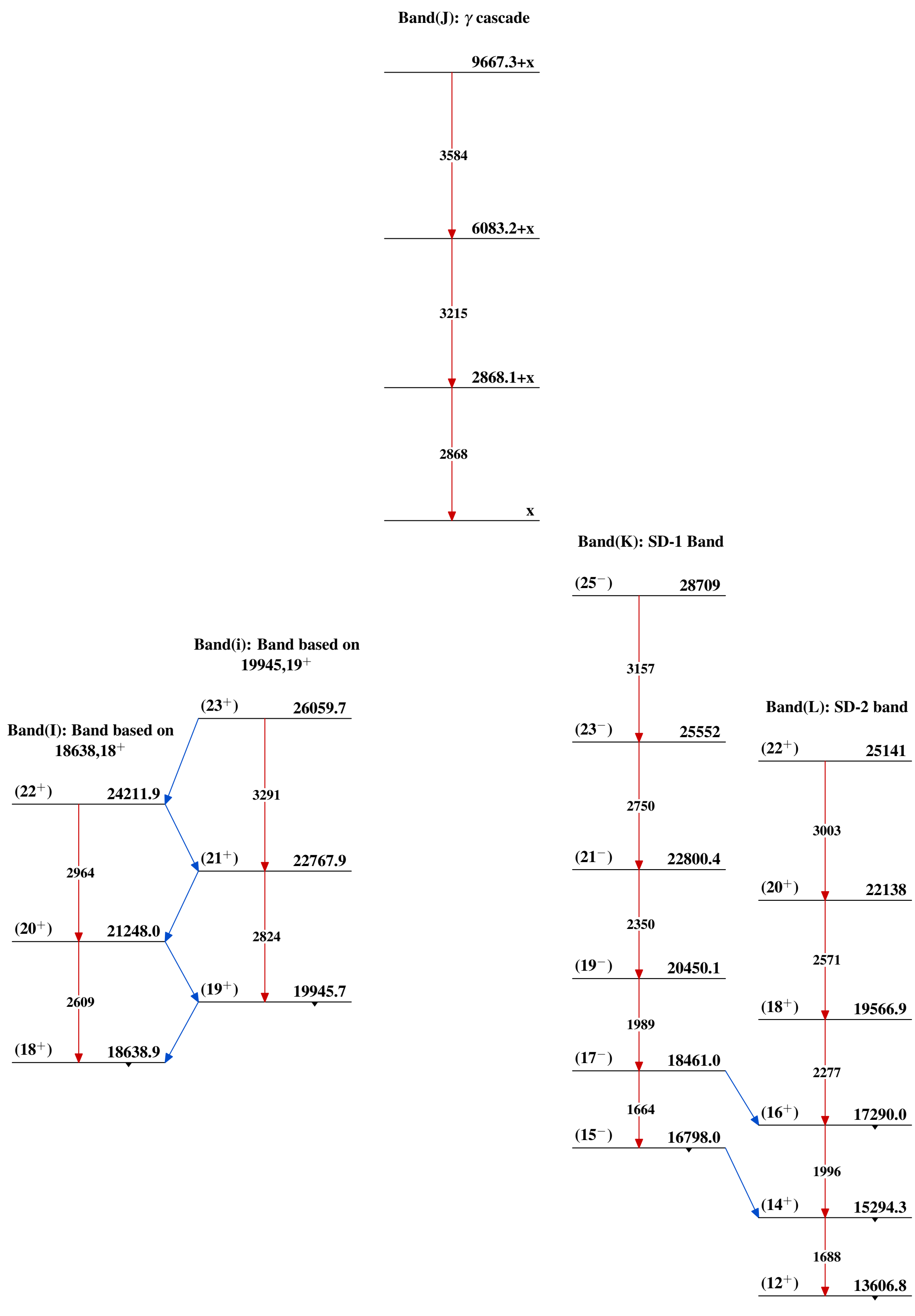
$^{58}_{28}Ni_{30}$

Adopted Levels, Gammas (continued)



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

Adopted Levels, Gammas (continued)



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

Adopted Levels, Gammas

	History		
Type	Author	Citation	Literature Cutoff Date
Update	E. Browne, J. K. Tuli		1-Dec-2013

Q(β^-)=−6128.0 *16*; S(n)=11387.73 *5*; S(p)=9532.38 *20*; Q(α)=−6291.0 *3* 2012Wa38

Datasets given as xref=k and l, both from XUNDL, based on 2013Sc08 and 2013Sc20 ^{60}Ni3c were included after the publication of this evaluation in Nuclear Data Sheets. This dataset has been revised accordingly.

Others:

Nuclear Structure.

2012Bh08, 2012Ca27, 2012Do04, 2012Gu16, 2012Ni03, 2011Gu20, 2011Kh10, 2011Mi12, 2011Ni21, 2011Qu04, 2010Gu13, 2010So04, 2010Lo03, 2009Ku13, 2008Ma17, 2006An27, 2003Sa08, 2002Be59, 2002De27, 2002Ma64.

Level energies and densities.

2011Ba39, 2011Be41, 2011Bh06, 2011Na02, 2007Te10, 2004Sa40, 2003Na24, 2003Pe07, 2002No08.

Compilations of B(E2) values: 2012Go17, 2012Pr08.

Mass measurements: 2007Gu09, 2005Gu36, 2004He32.

Nuclear Reactions: 2012Fu04, 2012Sc01, 2011Ch57, 2011Gu15, 2010Gu03, 2010Pr07, 2008Av03, 2007Po09, 2005Ha54.

^{60}Ni(d,d): 2012Ku21, 2006Ch28.

^{60}Ni(p,p′): 2011Mu10, 2010Be11, 2009Ku13, 2008Li05, 2004Ko34, 2002Sa49.

^{60}Ni(^{3}He,^{3}He): 2010Ha19.

^{60}Ni(α,α'): 2010Sa34, 2006Lu01.

^{61}Ni(p,d): 2009Le14.

^{60}Ni(^{17}O,^{17}O′): 2006Ha54, 2006Lu08.

^{60}Ni(^{18}O,^{18}O′): 2009Pe14, 2002Al01, 2002Ro29.

^{60}Ni(n,n): 2006Hu14.

^{59}Co(d,p): 2007Vo08.

^{58}Ni(^{18}O,^{16}O): 2006Pe02, 2005Al03, 2002Al01.

Discovery of ^{60}Ni: 2012Ga06.

1998Go18: Measured photon rates and energy spectra from radiative muon capture.

^{56}Fe(α,γ): 1974Fo03 for splitting of GDR, 1978KeZQ threshold effects.

Some L-values and arguments for J^π assignments

E(level)	L(p,t) L(t,p)	L(^{3}He,d)@	L(p,d)&	$\gamma(\theta)$ and lin pol in (^{7}Li,2npγ)	Other	Adopted
Target J^π=	0^+	$7/2^-$	$3/2^-$			
0	0	3	1 f		a,k	0^+
1332	2	1+3	1 f	2^+	b	2^+
2158	2	1	3 g	2^+	e	2^+
2284	0	3	1		l	0^+
2505	4	1+3	3 g	4^+	c	4^+
2626		1+3	3 g	3^+	e	3^+
3119	4	1				4^+
3124			1+3		d,h,q	2^+
3194		1+3	1+3		d,h,u	1^+
3269	2		1+3		e,h	2^+
3318		1			j?,l	0^+
3393	2		1+3		e,h	2^+
3588					k?,l	0^+
3670		1	(3)	(4^+)	m	4^+
3700					p	4^+
3736		1	1+3		e,h	2^+
3875			1+3		e,h	$1^+,2^+$
3925		1			e	$2^+,3^+$
4007			1+3		e,h,t	2^+
4020			1		d,h,t	1^+
4039	3		4			3^-
4078			1+3		d,h	$1^+,2^+$

4112			1+3		s,h,v	2^+
4165		1		5^+		5^+
4265				6^+		6^+
4319		1?	1+3		e,h	2^+
4335					v,e,h	2
4341	(0)					(0^+)
4355			1+3			$1^+,2^+,3^+$
4493		1+3?	1+3		d,h,p	2^+
4535			1+3		v,e,h	2^+
4548					d,h	$1^+,2^+$
4579	2				e	2^+
4760					e,h	1,2

Some L-values and arguments for J^π assignments (continued)

E(level)	L(p,t) L(t,p)	L(^{3}He,d)@	L(p,d)&	$\gamma(\theta)$ and lin pol in (^{7}Li,2npγ)	Other	Adopted
Target J^π=	0^+	$7/2^-$	$3/2^-$			
4844					e,h	1,2
4849					e	1,2,3
4958	4					4^+
4985				$(6^+,8^+)$	i	(6^+)
5015	4				p	(5^-)
5048					e,h	1,2
5069	(1)					(1^-)
5110					r	8^-
5120	4				p	4^+
5244	4					4^+
5348				7^-		7^-
5396	3				p	3^-
5449	2					2^+
5530	(0,2)				w	(2^+)
5662				5,7		5,7
5785				(7^+)		(7^+)
5800					p	2^+
5973					p	5^-
6181	(1)					(1^-)
6331					p	2^+
6810				$5^-,7^-,9^-$		$5^-,7^-,9^-$
7550					n	8^-
8280					o	(1^+)
8430	3					3^-
8433					n	8^-
8959					n	8^-
9208					n	8^-
11207	2					2^+
11620					o	(1^+)
11860					o	(1^+)
12333					n	8^-
12515					n	8^-
13908					n	8^-
14817					n	8^-
15499					n	8^-
16110					n	8^-

Question marks signify uncertain identification with E(level).
@ J^π of ^{59}Co(g.s.) is $7/2^-$.
& J^π of ^{61}Ni(g.s.) is $3/2^-$.
a. 0^+ from g.s. of even-even nucleus.
b. 1,2,3 from β^- decay of ^{60}Co(2^+) with logft=7.25 *6*.
c. 3^-,4,5,6,7^- from β^- decay of ^{60}Co(5^+) with logft=7.510 *1*.
d. $1^+,2^+,3^+$ from ε decay of ^{60}Cu(2^+) with logft<5.9.
e. 1,2,3 from ε decay of ^{60}Cu(2^+) with 5.9<logft<7.4.
f. J of transferred neutron is 3/2 from (pol p,d).

g. J of transferred neutron is 5/2 from (pol p,d).
h. Not 3^+ from γ decay to g.s.
i. 8^+ excluded from branch to 4^+ 2505 level.
j. 0^+ from $\sigma(\theta)$ in ^{56}Fe(^{6}Li,d).
k. 0^+ from $\sigma(\theta)$ in ^{58}Fe(^{3}He,n).
l. 0^+ from pair conversion and no corresponding γ (1981Pa10).
m. 4^+ from L(d,^{6}Li)=4 and $\sigma(\theta)$ in ^{60}Ni(e,e′).
n. 8^- from ^{60}Ni(e,e′).
o. (1^+) from $\sigma(\theta)$ and A(θ) in ^{60}Ni(p,p′), (pol p,p′).
p. From L(α,α′)
q. Not 1^+ from γ decay from 5244, 4^+ level.
r. From $\sigma(\theta)$ in ^{60}Ni(π^+,$\pi^{+\prime}$), (π^-,$\pi^{-\prime}$).
s. Not 1^+ from γ decay to 2506, 4^+ level.
t. From (γ,γ′)
u. From (n,n′γ), Hauser-Feshbach-Moldauer calculations
v. γ to 4^+
w. γ to 3^+

^{60}Ni Levels

For properties of 15 resonances in the range E(n)=0-18 keV from ^{59}Ni(n,γ), see 1981MuZQ.
Level configurations given in comments are from ^{58}Ni(α,^{2}He) and ^{60}Ni(pol p,p′) reactions.

Cross Reference (XREF) Flags

A	^{60}Co β^- decay (1925.28 d)	N	^{59}Co(α,t)	Others:	
B	^{60}Co β^- decay (10.467 min)	O	^{59}Co(^{3}He,dγ)	AA	^{56}Fe(^{16}O,^{12}C)
C	^{60}Cu ε decay	P	^{58}Ni(α,2pγ)	AB	^{60}Ni(n,n′γ)
D	^{60}Ni(p,p′), (pol p,p′)	Q	^{60}Ni(e,e′)	AC	^{60}Ni(π^+,$\pi^{+\prime}$), (π^-,$\pi^{-\prime}$)
E	^{28}Si(^{36}Ar,4pγ)	R	^{60}Ni(d,d′), (pol d,d′)	AD	^{64}Zn(d,^{6}Li)
F	^{59}Ni(n,γ) E=thermal	S	^{60}Ni(α,α′)	AE	^{58}Fe(^{16}O,^{14}C)
G	^{60}Ni(p,p′γ)	T	^{56}Fe(^{6}Li,d)	AF	^{60}Ni(γ,γ′)
H	^{59}Co(p,γ)	U	^{56}Fe(^{7}Li,2npγ)	AG	^{60}Ni(n,n′)
I	^{28}Si(^{35}Cl,3pγ)	V	^{58}Ni(α,^{2}He), (α,2p)	AH	^{61}Ni(^{3}He,α)
J	^{58}Ni(t,p), (pol t,p)	W	^{58}Ni(^{12}C,^{10}C)	AI	^{60}Ni(^{3}He,^{3}He′)
K	^{61}Ni(p,d), (pol p,d)	X	^{60}Ni(^{16}O,^{16}O′), (^{6}Li,^{6}Li′)	AJ	Coulomb excitation
L	^{62}Ni(p,t)	Y	^{50}Cr(^{12}C,2pγ)	AK	^{60}Ni(pol γ,γ′):res
M	^{59}Co(^{3}He,d)	Z	^{51}V(^{12}C,2npγ)	AL	^{60}Ni(γ,γ′),(pol γ,γ′):XUNDL-6

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
0.0[l]	0^+	stable	ABCDEFGHIJKLMNOPQRSTUVWXYZ	XREF: Others: AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL
1332.514[l] *4*	2^+	0.735 ps *21*	ABCDEFGHIJKLMNOPQRSTUVWXYZ	XREF: Others: AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL μ=+0.32 *6* (2001Ke02,2011StZZ); Q=+0.03 *5* (1974Le13,2011StZZ) Configuration=(ν $p_{3/2}$)^2. $T_{1/2}$: From 2008Or02, recommended value based on all known measurements. $T_{1/2}$=0.77 *4* Wt. av.: 0.90 ps *+21−14* in (n,n′γ), 0.91 ps *2* from DSA in Coul. ex. (2001Ke08), 0.715 ps *16* in ^{60}Ni(γ,γ′) (1970Me08), 0.9 ps *3* $\gamma\gamma$(t) (1976Kl04), 0.77 ps *6* from B(E2)=0.087 *7* (1974Si01), 0.73 ps *2* from B(E2)=0.0928 *20* (1974Li13), 0.69 ps *5* DSA (1973Fi15).

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Adopted Levels, Gammas (continued)

^{60}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
				μ: other: 0.18 *24* from transient field integral PAC (1978Ha13). Q: from Coulomb excitation reorientation (1989Ra17,2011StZZ). Other value: −0.104 *18* from electron scattering (1972Li12).
2158.632[l] *18*	2^+	0.59 ps *17*	ABCDEFGHIJKLMNOPQRSTU XYZ	XREF: Others: AA, AB, AG, AH, AJ, AK, AL $T_{1/2}$: calculated from measured B(E2)↑ in ^{60}Ni(e,e′). $T_{1/2}$: >1.0 ps (1989Ko54) in (n,n′γ).
2284.80 *4*	0^+	>1.5 ps	CD FG JKLM O RST	XREF: Others: AB, AG, AK, AL $T_{1/2}$: >0.69 ps (1989Ko54) in (n,n′γ).
2505.753[l] *4*	4^+	3.3 ps *10*	A CDEFGHIJKLMNOPQRSTUVWXYZ	XREF: Others: AA, AB, AD, AE, AG, AJ $T_{1/2}$: from Coul. ex. (2001Ke08). Others: 1.1 ps *3* from B(E4)=0.00165 *30* (from (e,e′), average of 0.0015 *3* (1969To08), 0.0018 *3*(1961Cr01)) and Iγ(2506γ)=2.0×10^{-6} *4* (1978Fu05)). Others (from DSA): 0.9 ps *+12−4* (1979Mo06), 3.3 ps *5* (1975Iv04), 0.5 ps *+19−3* (1973Ro20), ≤4 ps (1980Ke06), 0.4 ps *+4−2* (1989Ko54). J^{π}: configuration=((ν $p_{3/2}$)(ν $f_{5/2}$)).
2626.06[l] *5*	3^+	≈0.6 ps	CDEFGHIJKLM OP R U YZ	XREF: Others: AB, AG, AH $T_{1/2}$: from ≤0.7 ps in ^{56}Fe(^{7}Li,2npγ) and >0.5 ps in ^{60}Ni(p,p′γ), DSA. Other: 0.6 ps *+5−3* (1989Ko54) in (n,n′γ).
3119.87[l] *7*	4^+	0.24 ps *10*	EFGHIJ LMnOPQR TU WXYZ	XREF: Others: AA, AB $T_{1/2}$: from ^{56}Fe(^{7}Li,2npγ), DSA; 0.04 ps *1* (1989Ko54) in (n,n′γ).
3123.698 *25*	2^+	0.23 ps *+17−10*	CD FG K M P S U	XREF: Others: AA, AB, AF, AK, AL $T_{1/2}$: From (p,p′γ),
3185.98[n] *6*	(3^+)[k]	0.14 ps *4*	CdEFGHIjk no U	XREF: Others: AB $T_{1/2}$: others: 1.6 ps *7* from ^{56}Fe(^{7}Li,2npγ), DSA, 0.12 ps *+5−2* (1989Ko54) in (n,n′γ). J^{π}: $J^{\pi}=3^+$ in ^{28}Si(^{35}Cl,3pγ), (p,γ).
3193.87 *3*	1^+[k]	53 fs *14*	Cd FG jk M o	XREF: Others: AB, AF, AK, AL $T_{1/2}$: other: 19 fs *7* From ^{60}Ni(γ,γ′).
3269.19 *10*	2^+	71 fs *21*	CD FGH JKLM O TU	XREF: Others: AB, AF, AK, AL $T_{1/2}$: other: 0.10 ps *+3−2* (1989Ko54) in (n,n′γ).
3317.829 *25*	0^+	0.24 ps *+28−11*	D FG J M R T x	XREF: Others: AA, AB, AE, AK $T_{1/2}$: 0.10 ps *3* (1989Ko54) in (n,n′γ).
3381 *5*		0.23 ps *+35−11*	G N R x	
3393.14 *3*	2^+	0.13 ps *+6−4*	CD FGH JKLM S	XREF: Others: AB, AK, AL XREF: S(3350). $T_{1/2}$: 0.08 ps *6* (1989Ko54) in (n,n′γ).
3587.72[a] *3*	0^+	<40 ps	CD FG T	XREF: Others: AA, AB $T_{1/2}$: from ^{60}Ni(p,p′γ), pγ(t).
3619.46 *9*	3^+[k]	0.2 ps *+5−1*	CDEFGH K O U	XREF: Others: AB
3671.16[m] *11*	4^+	0.06 ps *4*	BCDE GHI K MNOPQ U	XREF: Others: AA, AB $T_{1/2}$: 0.11 ps *+7−3* (1989Ko54) in (n,n′γ).
3702.9[b] *10*	4^+		O RS X	XREF: Others: AB J^{π}: also L(^{16}O,^{16}O′)=4 for E=3690. *6*+ in (n,n′γ).
3730.82[n] *8*	4^+[k]	0.21 ps *+29−9*	DE GHIjk M O	XREF: Others: AB
3734.44 *6*	2^+	0.11 ps *4*	C FG jkL	XREF: Others: AB, AK $T_{1/2}$: 0.10 ps *2* (1989Ko54) in (n,n′γ).

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Adopted Levels, Gammas (continued)

^{60}Ni Levels (continued)

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	XREF	Comments
3798.0 *10*	1	118 fs *15*		XREF: Others: AL
3871.050 *22*	2^+[k]	>3.0 ps	CD FG JK	XREF: Others: AB, AK $T_{1/2}$: 0.21 ps +*16*−*9* in (p,p′γ), 0.04 ps *1* (1989Ko54) in (n,n′γ).
3887.36 *7*	2^+[k]	0.07 ps +*7*−*4*	C FG l	XREF: Others: AB
3895 *4*		59 fs *25*	D G l r	
3908 *3*	1	27 fs *5*		XREF: Others: AL
3925.18 *9*	$2^+,3^+$	0.19 ps +*19*−*8*	CD FGH M r	$T_{1/2}$: also from (p,p′γ): 0.09 ps +*16*−*12*.
4006.444 *24*	2^+	21 fs *7*	CD FG JK N	XREF: Others: AF, AK, AL J^π,$T_{1/2}$: from ^{60}Ni(γ,γ′). $T_{1/2}$: 28 fs *5* (1989Ko54) in (n,n′γ), 20 fs*10* in (p,p′γ).
4019.886 *24*	1^+	12 fs *3*	CD F K	XREF: Others: AF, AK, AL $T_{1/2}$,J^π: from ^{60}Ni(γ,γ′).
4035 *4*		25 fs *14*	G	
4039.89 *6*	3^-	22 fs *10*	ABCD FGH JKLM QRST VWX	XREF: Others: AA, AB $T_{1/2}$: 33 fs +*15*−*12* from (p,p′γ), 38 fs *11* in (n,n′γ).
4077.99 *5*	$1^+,2^+$	>12 fs	CD FGH K	XREF: Others: AB $T_{1/2}$: 14 fs *7* (1989Ko54) in (n,n′γ).
4111.96 *9*	2^+		D FG K	
4165.50[m] *8*	5^+	0.8 ps *4*	DE GHI K M OP U	XREF: Others: AB $T_{1/2}$: from ^{56}Fe(^{7}Li,2npγ), DSA. 1.4 ps +*14*−*6* from ^{58}Ni(α,2pγ), DSA, 0.09 ps +*9*−*3* (1989Ko54) in (n,n′γ), DSA.
4186.19 *24*	(4^+)		E	
4191.2 *10*			D G O	
4265.00[l] *8*	6^+	0.45 ps +*11*−*21*	DE P U YZ	$T_{1/2}$: from ^{51}V(^{12}C,2npγ), DSA. 0.5 ps *3* from ^{56}Fe(^{7}Li,2npγ), DSA.
4294.5 *3*			D H M	
4300.8[b] *7*			O S X	J^π: L(α,α′)=2+4 and L(^{3}He,d)=1 for E=4300; L(^{16}O,^{16}O′)=4 for E=4320.
4318.58 *5*	2^+		CD FG JK X	XREF: Others: AK
4335.52 *4*	2		C F	
4341 *4*	(0^+)	29 fs +*31*−*21*	D G L N	
4355.56 *14*	2^+	45 fs +*26*−*18*	CD G JK R	
4400.0 *7*			O	
4407.46[n] *8*	5^+[j]		D HI M P	
4450.7 *7*			O	
4493.16 *5*	2^+	16 fs *14*	CD FG K MNO S	
4534.14 *14*	2^+		CD F K R X	J^π: L(^{16}O,^{16}O′)=4 for E=4540 multiplet. G to 0^+ and 4^+.
4547.96 *3*	$1^+,2^+$		CD FG O	
4577.45 *6*	2^+	<18 fs	CD FG JK M	
4579.0 *5*	(4^+)		E	
4613[c] *7*			D K R	
4760.23 *9*	1,2		C F H	
4768 *4*		0.05 ps +*6*−*3*	D G T	
4779.13[b] *6*			D F m O	
4800.0 *5*			D H mN	
4843.93 *8*	2^+	6.9 fs *21*	Cd F jK	XREF: Others: AL J^π,$T_{1/2}$: From (γ,γ′),(pol γ,γ′).
4848.9 *6*	1,2,3		Cd H j M QR	
4859 *4*			G X	
4891 *10*			D	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{60}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
4928.98 *14*			D F	
4953.36 *7*			F	
4958 *4*	4^+	61 fs *21*	D FG L	
4970.6 *10*		0.06 ps *+5−3*	D G K M O	
4986.00[m] *8*	(6^+)	1.0[@] ps *+25−7*	DE HI P U W	
5014.45 *8*	(5^-)[j]		DE IJ N P RS	J^{π}: from L(α,α')=5 but $J^{\pi}=4^+$ in (α,2pγ). $T_{1/2}$: 0.21 ps *+256−1* from ^{58}Ni(α,2pγ), DSA.
5048.3 *7*	1,2		CD Q	XREF: Q(?). J^{π}: J^{π}(5050 *100*)=4^+,6^+ in (e,e′).
5065.02 *6*	(1^-)	2.98 fs *28*	b D F J T	XREF: Others: AL $T_{1/2}$: From (γ,γ'),(pol γ,γ').
5091.1 *10*			b O X	
5106 *4*		0.03 ps *+5−3*	D G	
5110[f] *20*	8^-		A	
5120.7[b] *7*	4^+		LMNO S	
5127.16 *17*			F	
5133 *5*			D G r	E(level): 5120 keV and 5132 keV might be the same level.
5148.51[n] *8*	6^+[j]		DE I P r	
5174 *5*			D G	
5191.7 *8*			D I	XREF: I(5192).
5205 *5*		16 fs *16*	D G T	
5236.20 *10*	$5^{(+)}$		E	
5244 *5*	4^+	0.05 ps *+5−3*	D G J l	
5264[c] *10*			D l RS	J^{π}: L(α,α')=2 for E=5250.
5288.55 *14*			D F w	
5307 *8*			d K w	
5318 *5*			d G	
5348.79 *7*	7^-	250 ps *21*	DE IJ P U YZ	$T_{1/2}$: from ^{56}Fe(^{7}Li,2npγ), DSA. 290 ps *50* from ^{51}V(^{12}C,2npγ), RDM.
5379 *5*			D G K M	
5396[c] *10*	3^-		D J S	
5410.8 *10*			O	
5428 *10*			D	
5446.98 *11*	2^+		D FGH JKL R	E(level): ^{59}Co(p,γ) gives 5444.6 *10* keV.
5449.5 *4*	6^+		E	
5476.04 *21*			D F N	
5530 *4*	(2^+)	20 fs *14*	D GH JKL	J^{π}: L(p,t)=(2) for E=5510 *30*. γ to 3^+.
5612.40 *4*			D F S	J^{π}: L(α,α')=3 for E=5600.
5642[c] *10*			D J T	
5650[b]			M O	
5663.03[m] *11*	7^+	0.7[@] ps *+21−3*	DE I P R U X	
5672.36 *7*			F	
5710.79 *4*			A D F	
5741 *10*			D	
5780.5 *5*			D GH L O	J^{π}: L(p,t)=(6) for a multiplet at 5770 *30*.
5785.1 *4*	(7^+)		D M U	
5799 *4*	2^+		D G S	
5830.8[d] *7*			D G O R	
5859.9 *5*			D F M	
5878.05 *9*			F	
5901.69 *10*	6^-		E	
5902.44 *7*			D F N	
5918.54 *21*			D F JKL	J^{π}: L(p,t)=4 for a level at 5920 *30*.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{60}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	S	XREF	Comments
5931.1 11	1	21 fs 6			XREF: Others: AL J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
5946[c] 10				D M R T	
5967.8 3				F	
5973[c] 10	5^-			B D S	
5992[c] 10				D J	
6028 10				D	
6054[c] 10				D jK	
6066.72 11				F	
6076.6[c] 9	(8)[j]			D Ij L	J^{π}: L(p,t)=(4) for E=6070 30.
6111.5[c] 10				D IJ	XREF: I(6112).
6112.43[n] 15	7^+			E	
6142[c] 10				D J S	J^{π}: L(α,α')=3 for E=6160.
6181.0[c] 7	1^-	1.80 fs 28		D JK R T	XREF: Others: AL $T_{1/2}$: From (γ,γ'),(pol γ,γ').
6192[c] 10				D K Q	
6229.3 11	(2^+)	20 fs 4	0.023 5		XREF: Others: AL J^{π}: assignment is tentative.
6239.2 3				A D F J N	
6278.34 11	(6^-)			DE L	
6292[c] 10				D J	
6327.21[c] 15	2^+			D F J S	
6362.05[c] 17				D F J	
6382.4 4	1	12 fs 3		D F	XREF: Others: AL $T_{1/2}$: From (γ,γ'),(pol γ,γ').
6403[c] 10				D L	J^{π}: L(p,t)=(3) for E=6400 30.
6431 10				D	
6461.10[m] 14	8^+[j]	1.2[@] ps +16−5		E IJ P	
6465.25 16	1^-	1.7 fs 5		D F w	XREF: Others: AL J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
6489.28 22				D F N w	
6515.0 9	1^+	3.0 fs 5			XREF: Others: AL J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
6516.72 23				D F S	J^{π}: L(α,α')=3 for E=6530.
6551[c] 10				D K	
6567.33 20				D F	
6587.6 6	1^-	1.25 fs 28		D J	XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
6610[c] 10				D K T	
6623 10				D	
6647.17 9				D F	
6658 10				D	
6672.4 9	(9)[j]			I	
6687 10				D	
6718.5 10	1^-	6.7 fs 13		D	XREF: Others: AL XREF: D(6708). E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
6736.5 10	(1)	6 fs 3		D	XREF: Others: AL XREF: D(6728). E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
6756.4 3				D F N	
6761.39 14	$7^{(+)}$			E	
6765[c] 10				DE L	J^{π}: L(p,t)=(3) for E=6770 30.
6791 10				D	

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Adopted Levels, Gammas (continued)

^{60}Ni Levels (continued)

E(level)[†]	Jπ[‡]	T1/2[#]	XREF	Comments
6810.95 *16*	9^-[j]	0.55 ps *28*	DE I PQ U YZ	$T_{1/2}$: from ^{56}Fe(^{7}Li,2npγ), DSA. 0.6 ps *+4−2* from ^{58}Ni(α,2pγ), DSA.
6834.92[c] *19*			D F K	
6835.18 *24*			F	
6837.2 *3*	8^-	0.6[@] ps *+5−2*	DE I P	
6859[c] *10*			D Q T W	
6892[c] *10*			A D	
6911.93 *9*	1^+	1.46 fs *28*	F	XREF: Others: AL XREF: AL(6913.7). J^π,$T_{1/2}$: From (g,γ′),(pol γ,γ′).
6950.4 *13*	(10)[j]		I	
6996.86 *20*			F S	J^π: L(α,α′)=(3,4).
7027.83[n] *15*	8^+		E	
7038.7 *7*	1^-	1.3 fs *4*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ′),(pol γ,γ′).
7056.27 *14*	[j]		F I	
7101.4 *13*	(10)[j]		I	
7110[h] *30*			L N Q T	J^π: L(p,t)=(2).
7207.6 *3*			F	
7222.80 *11*			F	
7250.0 *4*	8^+		E	
7290 *30*			L	
7316.13 *16*			F T W	
7339.68 *25*			F	
7360.97 *24*	(8)		E	
7380.3 *5*	8^+		E	
7414.16 *23*			F	
7433.45[m] *16*	9^+[j]		E I P	
7465.66 *25*	(7^-)		E	
7473.49 *24*	1^+	2.1 fs *3*	F	XREF: Others: AL J^π,$T_{1/2}$: From (γ,γ′),(pol γ,γ′).
7495.2 *4*			F	
7531.4 *4*	8^+		E	
7550[e] *8*	8^-		N Q	XREF: Q(7522).
7552.0 *3*			F	
7559.5 *8*	1^-	6.5 fs *22*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ′),(pol γ,γ′).
≈7570[g]			A T	
7590 *50*			W	
7627.4 *17*	[j]		I	
7647.4 *7*	1^-	0.27 fs *3*		XREF: Others: AK, AL XREF: AK(7650). E(level),J^π,$T_{1/2}$: From (γ,γ′),(pol γ,γ′).
7657.6 *8*	1^+	0.97 fs *14*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ′),(pol γ,γ′).
7684.1 *4*			F	
7690.0 *3*	1^-	0.208 fs *28*	F	XREF: Others: AL J^π,$T_{1/2}$: From (γ,γ′),(pol γ,γ′).
7691.4 *3*	(9^-)[j]		I	
7732.5 *4*	8^+		E	
7747.6 *5*	1^-	0.55 fs *21*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ′),(pol γ,γ′).
7760.33 *18*	8^-		E I	
7761.8 *3*	1^+	1.7 fs *4*	F O	J^π,$T_{1/2}$: From (γ,γ′),(pol γ,γ′).

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Adopted Levels, Gammas (continued)

^{60}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
7798.9 *3*			F	
7813.5 *13*	[j]		I	
7818.02 *13*			F	
7850.3 *10*	1^+	1.66 fs *28*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
7880.4 *12*	1^+	2.6 fs *6*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
7926.7 *17*	1^+	8.2 fs *36*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
7950.93 *24*	1^+	0.76 fs *14*	F	XREF: Others: AL J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
7980.81 *21*	9^+		E	
8042.6 *16*	1^+	7.7 fs *28*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8044.26[o] *17*	9^-[j]	0.04[@] ps *+31−4*	E I L P	
8074.4 *4*	8^+		E	
8086.0 *5*	1^-	0.201 fs *35*		XREF: Others: AK, AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8111.8 *12*	1^+	3.0 fs *7*	W	XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8126.6 *7*	1^-	0.45 fs *6*		XREF: Others: AK, AL XREF: AK(8124). E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8189.1 *7*	1	1.04 fs *21*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8261.5 *8*	1^-	0.40 fs *6*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8272.09 *19*	10^-		E	
8286.3 *3*	(1^+)		D F	Configuration=$((\nu\ f_{7/2})^{-1}(\nu\ f_{5/2}))1^+$.
8294.0 *8*	1^-	0.76 fs *28*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8351.8 *13*	1^+	2.4 fs *6*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8359.3 *15*	1^+	3.4 fs *11*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8389.9 *4*	9^-		E	
8407 *4*	1^-	6.3 fs *37*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8426.69 *12*	9^-		E	
8430 *30*	3^-		L	
8433[i] *10*	8^-		L N Q	XREF: N(8445).
8451.5 *16*	1	2.3 fs *6*		XREF: Others: AK, AL XREF: ak(6460). E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8464.0 *13*	1^-	2.7 fs *7*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8485.50[r] *24*	9^-		E	
8504.7 *3*			F	
8515.2 *9*	1^-	0.69 fs *14*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8521.11[o] *17*	10^-[j]	0.5[@] ps *+6−2*	E I P W	
8565.60 *18*			F	
8638.5 *3*			F	
8655.4 *9*	1^-	1.32 fs *28*		XREF: Others: AL E(level),J^{π},$T_{1/2}$: From (γ,γ'),(pol γ,γ').

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Adopted Levels, Gammas (continued)

^{60}Ni Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
8656.8 *8*	1^+	0.7 fs *6*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8666.21 *22*			F L	
8688.4 *13*	1^+	2.6 fs *7*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8688.92[m] *23*	10^+		E I	
8747.0 *12*	1^-	0.90 fs *21*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8768 *4*	1^+	8 fs *8*		XREF: Others: AK, AL XREF: AK(8760). E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8778.6 *10*	1^+	1.25 fs *35*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8781.6 *10*	1^-	1.25 fs *35*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8793.6 *9*	1^+	1.11 fs *35*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8846.5 *14*	1^+	1.5 fs *4*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8871.7 *16*	1^+	1.6 fs *4*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8890.5 *12*	1^+	0.83 fs *21*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8924.1 *10*	1^-	0.36 fs *6*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
8959[i] *10*	8^-	79 keV	A N Q	XREF: N(8994). $T_{1/2}$: from (α,t).
9010.5 *19*	1^-	2.1 fs *7*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9045.20 *24*			F	
9053.3 *24*	1^-	2.9 fs *12*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9060 *50*			W	
9068.9 *13*	1^+	1.04 fs *28*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9076.66 *17*			F	
9092.3 *8*	1^-	0.132 fs *28*		XREF: Others: AK, AL XREF: AK(9110). E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9123.01[r] *21*	10^-		E	
9132.2 *15*	1^-	0.90 fs *21*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9132.27[o] *20*	11^-[j]	0.18[@] ps *+10−8*	E I P	
9149 *3*	1^-	0.69 fs *35*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9208[e] *10*	8^-	127 keV	A N Q	XREF: Q(9172). $T_{1/2}$: from (α,t).
9256.0 *25*	1^-	1.5 fs *7*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9264.30 *24*	11^-		E	
9266.5 *24*	1^-	1.4 fs *7*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9274.7 *15*	1	2.6 fs *19*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9301.2 *15*	1^+	0.55 fs *21*		XREF: Others: AL

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Adopted Levels, Gammas (continued)

^{60}Ni Levels (continued)

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	XREF	Comments
9308.3 *14*	1^-	0.49 fs *21*		XREF: Others: AK, AL XREF: AK(9310). E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9346.82 *18*			F	
9352.6 *21*	1^-	1.9 fs *8*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9395.5 *15*	1^-	0.83 fs *35*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9410.7 *17*	1^-	1.2 fs *5*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9426.2 *4*	10^+		E	
9453.1 *16*	1^+	1.0 fs *4*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9463.9 *11*	1^-	0.21 fs *21*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9468 *4*	1^+	1.9 fs *12*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9504.9 *17*	1^-	10 fs *4*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9599.0 *15*	1^-	0.62 fs *28*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9622.5[t] *8*	10^-		E	
9640.2 *21*	1^-	3.0 fs *26*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9659.3 *8*	1^-	0.049 fs *14*		XREF: Others: AK, AL XREF: AK(9663). E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9665.67[v] *22*	10^+		E	
9701.4 *15*	1^-	0.8 fs *5*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9714.9 *4*	(10^+)		E	
9718.27 *22*	11^-		E	
9721.0 *18*	1^-	1.2 fs *8*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9751.5 *23*	1^-	4.2 fs *35*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9760.42 *24*	11^-		E	
9774.8 *20*	1^-	1.9 fs *14*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9807.5 *19*	1^-	1.6 fs *10*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9831 *4*	1^+	1.3 fs *6*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9832.0 *21*	1^-	1.3 fs *6*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9871.3 *20*	1^-	0.8 fs *6*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9887.9 *4*	10^+		E	
9893.5 *17*	1^-	0.49 fs *28*		XREF: Others: AL E(level),J^π,$T_{1/2}$: From (γ,γ'),(pol γ,γ').
9953.7 *3*			F	
9960.14[r] *23*	11^-		E	
9989.27[o] *24*	(12^-)[j]	0.21[@] ps *+21−7*	E I P	
10029.02 *17*			F W	

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Adopted Levels, Gammas (continued)

^{60}Ni Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
10054.23 *25*	(11^{-})	E	
10158.6 *3*	(12^{-})	E	
10241.7 *5*	(11^{-})	E	
10697.3 *3*	12^{-}	E	
10788.66[r] *22*	12^{-}	E	
10825.23 *25*	11^{+}	E	
10872.60 *24*	11^{+}	E	
10977.68 *23*	11^{+}	E	
≈10985		H	
11030.60 *21*	11^{+}	E	
11044.14[v] *24*	12^{+}	E H	
11079.1 *4*	(12^{-})	E	
11112.8[o] *3*	13^{-}[j]	E I	
11120.6[t] *9*	12^{-}	E L	
≈11138		H	
≈11149		H	
≈11158		H	
≈11207[&]	2^{+}	H L	Possible IAS of ^{60}Co, 58-keV level, ^{62}Ni(p,t).
11224.9[q] *5*	(11^{+})	E H	
11255.23[p] *20*	12^{+}	E	
(11387.700 *17*)	(1^{-},2^{-})	F	E(level): S(n)=11387.73 *5* (2012Wa38).
≈11429		H	
11443.40[s] *25*	13^{-}	E H	
11493.6 *5*	(12^{+})	E	
11553.3[r] *3*	13^{-}	E	
≈11599		H	
11620 *20*	(1^{+})	D	
≈11647		H	
≈11702		H	
≈11732		H	
11750[h] *30*		H L	J$^{\pi}$: L(p,t)=(2).
11785.6[q] *5*	(12^{+})	E	
11851.17[p] *23*	13^{+}	E	
11860[a] *20*	(1^{+})	D	Configuration=$((\nu\ f_{7/2})^{-1}(\nu\ f_{5/2}))1^{+}$.
11878.0 *5*	(13)	E H	
≈11932		H	
11950 *30*		H L	J$^{\pi}$: L(p,t)=(4). Possible IAS of ^{60}Co, 1006-keV level, ^{62}Ni(p,t).
≈12130		H	
12273.7[o] *4*	14^{-}[j]	I	
12333[i] *10*	8^{-}	E N Q	XREF: N(12305).
≈12355?		H	
≈12465		H	
12486.2[q] *5*	(13^{+})	E H	
12515[e] *16*	8^{-}	H N Q	XREF: Q(12505).
12578.4[p] *3*	14^{+}	E	
12742.1 *5*	13^{+}	E	
12774.7[v] *4*	14^{+}	E	
12859.3 *6*	13^{+}	E	No information about γ decay of this level.
13037.5[s] *10*	14^{-}	E	
13246.3[u] *4*	13^{+}	E	
13282.3[w] *5*	(14^{+})	E	
13353.0[q] *6*	(14^{+})	E	

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Adopted Levels, Gammas (continued)

^{60}Ni Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	XREF	Comments
13615.4[s] *5*	15$^-$		E	
13662.2[p] *4*	15$^+$		E	
13760 *30*			L	J$^{\pi}$: L(p,t)=(0).
13810.0[o] *5*	(15$^-$)		E	
13908[i] *10*	8$^-$		A N Q	XREF: N(13883).
14201.0[q] *6*	(15$^+$)		E	
14463.7[u] *4*	15$^+$		E	
14645.5[v] *5*	16$^+$		E	
14670 *30*			L	J$^{\pi}$: L(p,t)=(4).
14803.2[p] *4*	16$^+$		E	
14817[e] *10*	8$^-$	64 keV	N Q	XREF: Q(14840). T$_{1/2}$: from (α,t).
14933.9[w] *5*	16$^+$		E	
15164.8[q] *7*	(16$^+$)		E	
15281.5[t] *11*	(16$^-$)		E	
15499[i] *10*	8$^-$		N Q	XREF: N(15483).
16026.6[u] *5*	17$^+$		E	
16098.1[p] *4*	(17$^+$)		E	
16110 *23*	8$^-$		N	
16194.4[s] *8*	17$^-$		E	
16242.0?[q] *13*	(17$^+$)		E	
16842.4[v] *7*	18$^+$		E	
17235.8[w] *8*	18$^+$		E	
17911.6[u] *7*	19$^+$		E	
18131.4[t] *13*	(18$^-$)		E	
19238.4[s] *11*	(19$^-$)		E	
19504.4[v] *10*	20$^+$		E	
20017.9[w] *11*	(20$^+$)		E	
20177.5[u] *9*	21$^+$		E	
22863.5[v] *13*	(22$^+$)		E	
22996.5[u] *12*	23$^+$		E	

† Calculated from adopted gammas, except as noted.

‡ Spin/parity and single-particle configuration assignments for levels de-excited by γ rays are based on band structure, γ-ray multipolarities and angular distributions. See separate table for comments to individual levels.

\# From ^{60}Ni(p,p$'\gamma$) pγ coin DSA, except as noted.

@ From ^{58}Ni(α,2pγ), DSA.

& From ^{59}Co(p,γ).

a From ^{59}Ni(n,γ) E=thermal.

b From ^{59}Co(^{3}He,dγ).

c From ^{60}Ni(p,p$'$), (pol p,p$'$).

d From ^{60}Ni(p,p$'\gamma$).

e From ^{59}Co(α,t).

f From ^{60}Ni(π^+,$\pi^{+\prime}$), (π^-,$\pi^{-\prime}$).

g From ^{56}Fe(^{6}Li,d).

h From ^{62}Ni(p,t).

i From ^{60}Ni(e,e$'$).

j From ^{28}Si(^{35}Cl,3p).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{60}Ni Levels (continued)

[k] From comparison with Hauser-Feshbach-Moldauer calculations in (n,n′γ).

[l] Band(A): γ cascade based on g.s..

[m] Band(B): ΔJ=1 structure based on 3671, 4$^+$.

[n] Band(C): ΔJ=1 structure based on 3186, 3$^+$.

[o] Band(D): Magnetic-dipole rotational band-1. Band based on 8044, 9$^-$ state. Configuration=$\pi[1f_{7/2}^{-1}(fp)^1]\otimes\nu[1g_{9/2}^1(fp)^3]$.

[p] Band(E): Magnetic-dipole rotational band-2. Band based on 11255, 12$^+$ state. Configuration=$\pi[1f_{7/2}^{-1}(fp)^1]\otimes\nu[1g_{9/2}^2(fp)^2]$ or $\pi[1f_{7/2}^{-1}1g_{9/2}^1]\otimes\nu[1g_{9/2}^1(fp)^3]$.

[q] Band(F): Magnetic-dipole rotational band-3. Band based on 11225, (11$^+$) state. Configuration=$\pi[1f_{7/2}^{-1}(fp)^1]\otimes\nu[1g_{9/2}^2(fp)^2]$ or $\pi[1f_{7/2}^{-1}1g_{9/2}^1]\otimes\nu[1g_{9/2}^1(fp)^3]$.

[r] Band(G): Magnetic-dipole rotational band-4. Band based on 8485, 9$^-$ state. Configuration=$\pi[1f_{7/2}^{-1}(fp)^1]\otimes\nu[1g_{9/2}^1(fp)^3]$.

[s] Band(H): ΔJ=2 band based on 11443, 13$^-$. Configuration=$\pi[1f_{7/2}^{-2}(fp)^2]\otimes\nu[1g_{9/2}^1(fp)^3]$.

[t] Band(h): ΔJ=2 band based on 11120, 12$^-$. Configuration=$\pi[1f_{7/2}^{-2}(fp)^2]\otimes\nu[1g_{9/2}^1(fp)^3]$.

[u] Band(I): ΔJ=2 band based on 13246, 13$^+$. Configuration=$\pi[1f_{7/2}^{-3}(1g_{9/2}^1(fp)^2]\otimes\ \nu[1g_{9/2}^1(fp)^3]$.

[v] Band(J): ΔJ=2 band based on 9665, 10$^+$. Two forked spin sequences, one based on 9665, 10$^+$ and the other on 13282, (14$^+$). Configuration=$\pi[1f_{7/2}^{-2}(1g_{9/2}^1(fp)^1]\otimes\ \nu[1g_{9/2}^1(fp)^3]$.

[w] Band(j): ΔJ=2 band based on 13282, (14$^+$). Two forked spin sequences, one based on 9665, 10$^+$ and the other on 13282, (14$^+$). Configuration=$\pi[1f_{7/2}^{-2}(1g_{9/2}^1(fp)^1]\otimes\ \nu[1g_{9/2}^1(fp)^3]$.

Adopted Levels, Gammas (continued)

$\gamma(^{60}Ni)$

All γ data from (^{36}Ar,4pγ) where Eγ is from this reaction.

E_i(level)	J_i^π	E_γ[‡]	I_γ	E_f	J_f^π	Mult.[#]	δ[@]	α[†]	$I_{(\gamma+ce)}$	Comments
1332.514	2^+	1332.501[b] *5*	100[b]	0.0	0^+	E2		0.0001625 *23*		α=0.0001625 *23*; α(K)=0.0001137 *16*; α(L)=1.108×10^{-5} *16*; α(M)=1.560×10^{-6} *22* α(N)=6.73×10^{-8} *10*; α(IPF)=3.61×10^{-5} *5* B(E2)(W.u.)=13.1 *4*
2158.632	2^+	826.06[&] *3*	100.0[&] *24*	1332.514	2^+	M1+E2	+0.9 *3*	0.000337 *18*		α=0.000337 *18*; α(K)=0.000303 *17*; α(L)=2.97×10^{-5} *17*; α(M)=4.18×10^{-6} *23*; α(N+..)=1.80×10^{-7} *1* α(N)=1.80×10^{-7} *10* B(M1)(W.u.)=0.031 *13*; B(E2)(W.u.)=7.E+1 *4* δ: av of +0.67 *21* from ^{60}Ni(p,p′γ), and +1.2 *3* from ^{60}Cu ε decay. Poor agreement with +0.03 *+1−25* from ^{56}Fe(^{7}Li,2npγ). −0.2 *2* from DCO (2008To15).
		2158.57[&] *10*	17.6[&] *24*	0.0	0^+	(E2)		0.000439 *7*		B(E2)(W.u.)=0.22 *7* α=0.000439 *7*; α(K)=4.45×10^{-5} *7*; α(L)=4.32×10^{-6} *6*; α(M)=6.08×10^{-7} *9*; α(N+..)=0.000390 *6* α(N)=2.64×10^{-8} *4*; α(IPF)=0.000389 *6* Mult.: $\Delta\pi$=no from J^π′s of connecting levels.
2284.80	0^+	952.4[a] *2*	100[a]	1332.514	2^+					
		2284.87		0.0	0^+	E0			0.016	$I_{(\gamma+ce)}$: I(E±) from 1961Pa10 is given. Ice(K)(2285)/Ice(K)(952)=0.074 *16*, Ice(K)(2285)/I(pair)=0.130 *28*, B(E0)/B(E2)=0.027 *4*, ρ^2<0.028 (1981Pa10).
2505.753	4^+	347.14[b] *7*	0.0076[b] *5*	2158.632	2^+	E2		0.00557 *8*		α=0.00557 *8*; α(K)=0.00499 *7*; α(L)=0.000503 *7*; α(M)=7.06×10^{-5} *10*; α(N+..)=2.90×10^{-6} *4* α(N)=2.90×10^{-6} *4* B(E2)(W.u.)=0.19 *6* Mult.: From DCO (2008To15).
		1173.228[b] *3*	100.00[b] *3*	1332.514	2^+	E2(+M3)	−0.0025 *22*	0.0001722 *25*		α=0.0001722 *25*; α(K)=0.0001500 *21*; α(L)=1.465×10^{-5} *21*; α(M)=2.06×10^{-6} *3* α(N)=8.88×10^{-8} *13*; α(IPF)=5.42×10^{-6} *8* B(E2)(W.u.)=(5.5 *17*); B(M3)(W.u.)=(1.8×10^2 *+32−18*)

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	δ[@]	α[†]	Comments
									Additional information 1. δ: from ^{60}Co β^- decay (1925.28 d). Others: -0.09 $+50-30$ from $^{58}Ni(\alpha,2p\gamma)$, $+0.02$ $+18-2$ from $^{56}Fe(^7Li,2np\gamma)$.
2505.753	4^+	2505.692 *5*	2.0×10^{-6} *4*	0.0	0^+	[E4]		8.63×10^{-5} *12*	$\alpha=8.63\times10^{-5}$ *12*; $\alpha(K)=7.76\times10^{-5}$ *11*; $\alpha(L)=7.58\times10^{-6}$ *11*; $\alpha(M)=1.069\times10^{-6}$ *15*; $\alpha(N+..)=4.62\times10^{-8}$ *7* $\alpha(N)=4.62\times10^{-8}$ *7* B(E4)(W.u.)=1.8 *7* E_γ: from E(level). Mult.: from J^{π}'s of connecting levels. Additional information 2. B(E4)(W.u.): 4.8 *10* from measured B(E4)↑ in $^{60}Ni(e,e')$.
2626.06	3^+	120.5[a] *3*	5.5[a] *5*	2505.753	4^+	M1+E2		0.15 *13*	$\alpha(K)=0.14$ *12*; $\alpha(L)=0.015$ *13*; $\alpha(M)=0.0021$ *18*; $\alpha(N+..)=8.E-5$ *7* $\alpha(N)=8.E-5$ *7*
		467.3[a] *2*	100[a] *5*	2158.632	2^+	M1(+E2)	+0.02 *+11−27*	0.00102 *7*	$\alpha=0.00102$ *7*; $\alpha(K)=0.00091$ *6*; $\alpha(L)=9.0\times10^{-5}$ *6*; $\alpha(M)=1.27\times10^{-5}$ *8*; $\alpha(N+..)=5.4\times10^{-7}$ *4* $\alpha(N)=5.4\times10^{-7}$ *4* B(M1)(W.u.)≈(0.23); B(E2)(W.u.)≈(0.76) δ: +0.38 *18* (2008To15).
		1293.7[a] *2*	53[a] *5*	1332.514	2^+	M1+E2	−3.1 *+4−6*	0.0001595 *23*	$\alpha=0.0001595$ *23*; $\alpha(K)=0.0001198$ *18*; $\alpha(L)=1.168\times10^{-5}$ *17*; $\alpha(M)=1.646\times10^{-6}$ *24* $\alpha(N)=7.10\times10^{-8}$ *11*; $\alpha(IPF)=2.63\times10^{-5}$ *5* B(M1)(W.u.)≈0.00053; B(E2)(W.u.)≈5.6 Mult.: from 1989Ko54 in $(n,n'\gamma)$ and $(^{36}Ar,4p\gamma)$. δ: from $(n,n'\gamma)$; +0.11 *15* (2008To15).
3119.87	4^+	493.90[&] *20*	8.7[&] *22*	2626.06	3^+	M1+(E2)	+0.25 *40*	0.00094 *20*	$\alpha=0.00094$ *20*; $\alpha(K)=0.00085$ *18*; $\alpha(L)=8.4\times10^{-5}$ *18*; $\alpha(M)=1.18\times10^{-5}$ *25*; $\alpha(N+..)=5.1\times10^{-7}$ *11* $\alpha(N)=5.1\times10^{-7}$ *11* B(M1)(W.u.)=0.06 *3*; B(E2)(W.u.)=(3.E+1 *+9−3*) δ: From DCO (2008To15).
		1787.20[&] *10*	100.0[&] *22*	1332.514	2^+	E2		0.000281 *4*	$\alpha=0.000281$ *4*; $\alpha(K)=6.30\times10^{-5}$ *9*; $\alpha(L)=6.12\times10^{-6}$ *9*; $\alpha(M)=8.62\times10^{-7}$ *12*; $\alpha(N+..)=0.000211$ *3* $\alpha(N)=3.73\times10^{-8}$ *6*; $\alpha(IPF)=0.000211$ *3* B(E2)(W.u.)=9 *4* Mult.: From DCO=1.10 5 (2008To15).

$^{60}_{28}Ni_{32}$-16

Adopted Levels, Gammas (continued)

$\gamma(^{60}\mathrm{Ni})$ (continued)

E_i(level)	J_i^{π}	E_{γ}[‡]	I_{γ}	E_f	J_f^{π}	Mult.[#]	δ[@]	α[†]	Comments
3123.698	2^+	497.9[a] 2	3.68[a] 20	2626.06	3^+				
		613.7 3	4.4 11						Mult.: d not consistent with ΔJ^{π}.
		839.2[a] 4	1.01[a] 16	2284.80	0^+				
		965.2[a] 3	0.66[a] 14	2158.632	2^+				
		1791.6[a] 3	100[a] 5	1332.514	2^+	M1+E2	−0.21 4	0.000237 4	α=0.000237 4; α(K)=5.93×10^{-5} 9; α(L)=5.75×10^{-6} 8; α(M)=8.10×10^{-7} 12; α(N+..)=0.000171 3 α(N)=3.52×10^{-8} 5; α(IPF)=0.000171 3 B(M1)(W.u.)=0.013 +6−10; B(E2)(W.u.)=0.34 +20−28 Mult.,δ: from $\gamma\gamma(\theta)$ in ^{60}Cu ε decay.
		3124.1[a] 3	10.5[a] 6	0.0	0^+				
3185.98	(3^+)	680.30[&] 15	86[&] 14	2505.753	4^+	M1+E2		0.00055 11	α=0.00055 11; α(K)=0.00050 10; α(L)=4.9×10^{-5} 10; α(M)=6.9×10^{-6} 14; α(N+..)=2.9×10^{-7} 6 α(N)=2.9×10^{-7} 6
		1027.33[&] 8	100[&] 14	2158.632	2^+	M1+E2	−6.1 +9−10	0.000226 4	α=0.000226 4; α(K)=0.000203 3; α(L)=1.99×10^{-5} 3; α(M)=2.80×10^{-6} 4; α(N+..)=1.200×10^{-7} 17 α(N)=1.200×10^{-7} 17 B(M1)(W.u.)=0.0014 6; B(E2)(W.u.)=9.E+1 3 Mult.,δ: from 1989Ko54 in (n,n′γ).
		1853.8[&] 3	92[&] 14	1332.514	2^+	M1+E2		0.00028 3	α=0.00028 3; α(K)=5.72×10^{-5} 18; α(L)=5.55×10^{-6} 18; α(M)=7.82×10^{-7} 25; α(N+..)=0.000218 24 α(N)=3.39×10^{-8} 11; α(IPF)=0.000218 24
3193.87	1^+	909.2[a] 2	42.6[a] 19	2284.80	0^+				
		1035.2[a] 2	78[a] 4	2158.632	2^+				
		1861.6[a] 3	100[a] 6	1332.514	2^+				
		3194.1[a] 3	42.6[a] 19	0.0	0^+				
3269.19	2^+	643.2[a] 3	44.0[a] 24	2626.06	3^+				
		984.5[a] 6	3.6[a] 20	2284.80	0^+	[E2]		0.000251 4	α=0.000251 4; α(K)=0.000225 4; α(L)=2.21×10^{-5} 4; α(M)=3.11×10^{-6} 5; α(N+..)=1.334×10^{-7} 19 α(N)=1.334×10^{-7} 19 B(E2)(W.u.)=10 6
		1110.5[a] 4	48[a] 8	2158.632	2^+				
		1936.9[a] 3	100[a] 4	1332.514	2^+				
		3269.4[a] 3	35.2[a] 20	0.0	0^+	[E2]		0.000920 13	α=0.000920 13; α(K)=2.22×10^{-5} 4; α(L)=2.14×10^{-6} 3; α(M)=3.02×10^{-7} 5; α(N+..)=0.000895 13 α(N)=1.314×10^{-8} 19; α(IPF)=0.000895 13 B(E2)(W.u.)=0.23 7
3317.829	0^+	1159.09[i] 13	1.18[i] 11	2158.632	2^+				
		1985.27[i] 3	100.0[i] 19	1332.514	2^+				

From ENSDF

$^{60}_{28}\mathrm{Ni}_{32}$-17

$\gamma(^{60}$Ni) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	α[†]	$I_{(\gamma+ce)}$	Comments
3317.829	0^+	3318.6		0.0	0^+	E0		0.064	$I_{(\gamma+ce)}$: I(E±) from 1961Pa10 is given. I(pair)(3318)/Ice(K)(1986)=11.5 *12*, B(E0)/B(E2)=0.49 *8*, ρ^2=0.077 *42* (1981Pa10).
3381		1222[c] *5*	100[c]	2158.632	2^+				
3393.14	2^+	1234.51[i] *7*	12.6[i] *7*	2158.632	2^+				
		2060.58[i] *3*	100.0[i] *23*	1332.514	2^+				
		3393.05[i] *20*	7.4[i] *7*	0.0	0^+	[E2]	0.000968 *14*		α=0.000968 *14*; α(K)=2.09×10^{-5} *3*; α(L)=2.02×10^{-6} *3*; α(M)=2.85×10^{-7} *4*; α(N+..)=0.000945 *14* α(N)=1.239×10^{-8} *18*; α(IPF)=0.000945 *14* B(E2)(W.u.)=0.043 *+14−21*
3587.72	0^+	393.76[i] *6*	32.7[i] *8*	3193.87	1^+				
		1429.07[i] *3*	100[i] *2*	2158.632	2^+				
		2255.18[i] *5*	46.4[i] *15*	1332.514	2^+				
		3588		0.0	0^+	E0		0.13	$I_{(\gamma+ce)}$: I(E±) from 1961Pa10 is given. I(pair)(3588)/Ice(K)(2256)=68 *11*, B(E0)/B(E2)(1429)=0.13 *3*, B(E0)/B(E2)(2256)=2.9 *5* (1981Pa10).
3619.46	3^+	993.46[i] *10*	100[i]	2626.06	3^+	D			
		1113.9[i] *3*	33[i] *4*	2505.753	4^+				
		1460[dk]		2158.632	2^+				
3671.16	4^+	1165.2 *2*	100	2505.753	4^+	M1+E2	0.000162 *12*		α=0.000162 *12*; α(K)=0.000142 *11*; α(L)=1.39×10^{-5} *11*; α(M)=1.96×10^{-6} *15*; α(N+..)=4.0×10^{-6} *7* α(N)=8.4×10^{-8} *6*; α(IPF)=3.9×10^{-6} *7*
		1512.1 *6*	1.6	2158.632	2^+	[E2]	0.000189 *3*		α=0.000189 *3*; α(K)=8.75×10^{-5} *13*; α(L)=8.51×10^{-6} *12*; α(M)=1.199×10^{-6} *17*; α(N+..)=9.16×10^{-5} *13* α(N)=5.18×10^{-8} *8*; α(IPF)=9.15×10^{-5} *13* B(E2)(W.u.)=1.3 *9*
3702.9	4^+	583 *1*	100	3119.87	4^+				E_γ: from (n,n′γ).
3730.82	4^+	545.0 *1*	27 *9*	3185.98	(3^+)	M1+E2	0.0010 *3*		α=0.0010 *3*; α(K)=0.00089 *25*; α(L)=8.8×10^{-5} *25*; α(M)=1.2×10^{-5} *4*; α(N+..)=5.3×10^{-7} *15* α(N)=5.3×10^{-7} *15*
		610.9 *3*	27 *9*	3119.87	4^+	D			
		1105.0 *4*	45 *9*	2626.06	3^+	M1+E2	0.000178 *15*		α=0.000178 *15*; α(K)=0.000159 *13*; α(L)=1.56×10^{-5} *13*; α(M)=2.19×10^{-6} *18*; α(N+..)=9.3×10^{-7} *17* α(N)=9.5×10^{-8} *8*; α(IPF)=8.4×10^{-7} *16*
		1224.9 *2*	63 *18*	2505.753	4^+	D			
		2398.4 *3*	100 *18*	1332.514	2^+	E2	0.000547 *8*		α=0.000547 *8*; α(K)=3.70×10^{-5} *6*; α(L)=3.58×10^{-6} *5*; α(M)=5.05×10^{-7} *7*; α(N+..)=0.000506 *7* α(N)=2.19×10^{-8} *3*; α(IPF)=0.000506 *7* B(E2)(W.u.)=0.9 *+5−9*
3734.44	2^+	611[ak]	≤3[a]	3123.698	2^+				
		1451.4[a] *5*	22[a] *4*	2284.80	0^+	[E2]	0.0001754 *25*		α=0.0001754 *25*; α(K)=9.51×10^{-5} *14*; α(L)=9.26×10^{-6} *13*;

Adopted Levels, Gammas (continued)

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ	E_f	J_f^π	Mult.[#]	α[†]	Comments
								$\alpha(M)=1.304\times10^{-6}$ *19*; $\alpha(N+..)=6.98\times10^{-5}$ $\alpha(N)=5.63\times10^{-8}$ *8*; $\alpha(IPF)=6.97\times10^{-5}$ *10* B(E2)(W.u.)=10 *5*
3734.44	2^+	2403.3[a] *6*	100[a] *11*	1332.514	2^+			
		3735.6[a] *13*	3.4[a] *12*	0.0	0^+	[E2]	0.001096 *16*	$\alpha=0.001096$ *16*; $\alpha(K)=1.80\times10^{-5}$ *3*; $\alpha(L)=1.742\times10^{-6}$ *25*; $\alpha(M)=2.45\times10^{-7}$ *4*; $\alpha(N+..)=0.001076$ *15* $\alpha(N)=1.068\times10^{-8}$ *15*; $\alpha(IPF)=0.001076$ *15* B(E2)(W.u.)=0.014 *7*
3798.0	1	3797.9[j] *10*	100[j]	0.0	0^+	[j]		
3871.050	2^+	677.17[i] *5*	16.7[i] *4*	3193.87	1^+			
		747.33[i] *3*	100[i] *2*	3123.698	2^+			
		751.9[i] *4*	3.2[i] *7*	3119.87	4^+			
		1244.93[i] *22*	2.6[i] *5*	2626.06	3^+			
		1712.30[i] *9*	91[i] *2*	2158.632	2^+			
		2538.53[i] *4*	55[i] *1*	1332.514	2^+			
		3870.94[i] *7*	43.5[i] *15*	0.0	0^+			
3887.36	2^+	569.5[i] *4*	7[i] *3*	3317.829	0^+			
		693.57[i] *11*	30[i] *3*	3193.87	1^+			
		1381.8[i] *3*	28[i] *5*	2505.753	4^+			
		2554.69[i] *10*	100[i] *4*	1332.514	2^+			
3895		1269[c] *5*	67[c]	2626.06	3^+			
		2563[c] *5*	100[c]	1332.514	2^+			
3908	1	3908[j] *3*	100[j]	0.0	0^+	[j]		
3925.18	$2^+,3^+$	305.7[i] *3*	30[i] *6*	3619.46	3^+			
		739.2[i] *3*	57[i] *10*	3185.98	(3^+)			
		805.6[i] *4*	21[i] *6*	3119.87	4^+			
		1419.40[i] *10*	100[i] *8*	2505.753	4^+			
		1766.5[i] *3*	55[i] *8*	2158.632	2^+			
4006.444	2^+	883.1[i] *3*	1.0[i] *2*	3123.698	2^+			
		1380.4[i] *3*	2.8[i] *4*	2626.06	3^+			
		2673.86[i] *4*	100[i] *2*	1332.514	2^+			
		4006.30[i] *4*	75[i] *2*	0.0	0^+	E2	0.001190 *17*	$\alpha=0.001190$ *17*; $\alpha(K)=1.622\times10^{-5}$ *23*; $\alpha(L)=1.566\times10^{-6}$ *22*; $\alpha(M)=2.21\times10^{-7}$ *3*; $\alpha(N+..)=0.001172$ $\alpha(N)=9.60\times10^{-9}$ *14*; $\alpha(IPF)=0.001172$ *17* B(E2)(W.u.)=0.8 *3* Mult.: From (γ,γ'),(pol γ,γ').
4019.886	1^+	431.9[i] *4*	0.5[i] *2*	3587.72	0^+			
		702.11[i]	1.5[i] *2*	3317.829	0^+			
		896.23[i] *6*	7.1[i] *3*	3123.698	2^+			
		1734.98[i] *11*	9.3[i] *5*	2284.80	0^+			

Adopted Levels, Gammas (continued)

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ	E_f	J_f^π	Mult.[#]	δ[@]	α[†]	Comments
4019.886	1^+	2687.33[i] *4*	42[i] *1*	1332.514	2^+				
		4019.74[i] *5*	100[i] *3*	0.0	0^+	M1		0.001087 *16*	α=0.001087 *16*; α(K)=1.568×10^{-5} *22*; α(L)=1.513×10^{-6} *22*; α(M)=2.13×10^{-7} *3*; α(N+..)=0.001069 α(N)=9.29×10^{-9} *13*; α(IPF)=0.001069 *15* Mult.: From (γ,γ'),(pol γ,γ').
4035		2703[c] *5*	100[c]	1332.514	2^+				
		4035[c] *5*	100[c]	0.0	0^+				
4039.89	3^-	853.8[i] *4*	10[i] *2*	3185.98	(3^+)				
		1881.15[i] *12*	51[i] *4*	2158.632	2^+	[E1]		0.000586 *9*	α=0.000586 *9*; α(K)=3.21×10^{-5} *5*; α(L)=3.11×10^{-6} *5*; α(M)=4.37×10^{-7} *7*; α(N+..)=0.000550 *8* α(N)=1.90×10^{-8} *3*; α(IPF)=0.000550 *8* B(E1)(W.u.)=0.0010 *5*
		2707.44[i] *8*	100[i] *4*	1332.514	2^+	[E1]		0.001103 *16*	α=0.001103 *16*; α(K)=1.91×10^{-5} *3*; α(L)=1.84×10^{-6} *3*; α(M)=2.59×10^{-7} *4*; α(N+..)=0.001082 *16* α(N)=1.127×10^{-8} *16*; α(IPF)=0.001082 *16* B(E1)(W.u.)=0.0006 *3*
4077.99	$1^+,2^+$	1451.88[i] *16*	14[i] *2*	2626.06	3^+				
		1919.28[i] *7*	55[i] *3*	2158.632	2^+				
		2745.47[i] *6*	100[i] *3*	1332.514	2^+				
		4077.6[i] *9*	9[i] *2*	0.0	0^+				
4111.96	2^+	992[c] *5*	92[c]	3119.87	4^+				
		1485.94[i] *19*	46[i] *5*	2626.06	3^+				
		1606.10[i] *14*	70[i] *6*	2505.753	4^+				
		2779.42[i] *14*	100[i] *6*	1332.514	2^+				
		4111.6[i] *8*	49[i] *9*	0.0	0^+				
4165.50	5^+	494.4 *2*	9 *2*	3671.16	4^+	M1+E2		0.0013 *5*	α=0.0013 *5*; α(K)=0.0012 *4*; α(L)=0.00012 *4*; α(M)=1.6×10^{-5} *6*; α(N+..)=6.9×10^{-7} *22* α(N)=6.9×10^{-7} *22*
		1044.4 *2*	14 *4*	3119.87	4^+	M1+E2		0.000200 *18*	α=0.000200 *18*; α(K)=0.000180 *16*; α(L)=1.76×10^{-5} *16*; α(M)=2.48×10^{-6} *23*; α(N+..)=1.07×10^{-7} *1* α(N)=1.07×10^{-7} *10*
		1539.0 *3*	14 *4*	2626.06	3^+				
		1659.6 *3*	100 *9*	2505.753	4^+	M1+E2	−1.7 *4*	0.000224 *6*	α=0.000224 *6*; α(K)=7.15×10^{-5} *12*; α(L)=6.94×10^{-6} *12*; α(M)=9.78×10^{-7} *16*; α(N+..)=0.000145 *5* α(N)=4.24×10^{-8} *7*; α(IPF)=0.000145 *5* B(M1)(W.u.)=0.0011 *7*; B(E2)(W.u.)=2.2 *12* δ: other: −1.0 *+5−4* from ^{58}Ni(α,2pγ), −1.1 +8-9 in (^{36}Ar,4pγ).
4186.19	(4^+)	515 *1*	67 *33*	3671.16	4^+	(D)			
		1560.2 *4*	100 *33*	2626.06	3^+	(M1+E2)		0.000186 *17*	α=0.000186 *17*; α(K)=7.9×10^{-5} *4*; α(L)=7.7×10^{-6} *4*; α(M)=1.08×10^{-6} *5*; α(N+..)=9.8×10^{-5} *13* α(N)=4.69×10^{-8} *19*; α(IPF)=9.8×10^{-5} *13*

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$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	δ[@]	α[†]	Comments
4191.2		462[dk]		3730.82	4^+				
		520[g]		3671.16	4^+				
		572[c] *5*	75[c]	3619.46	3^+				
		1565[c] *5*	100[c]	2626.06	3^+				
4265.00	6^+	1145.67[e] *15*	5.4[e] *8*	3119.87	4^+	E2		0.000179 *3*	α=0.000179 *3*; α(K)=0.0001583 *23*; α(L)=1.546×10^{-5} *22*; α(M)=2.18×10^{-6} *3*; α(N+..)=3.06×10^{-6} *5* α(N)=9.37×10^{-8} *14*; α(IPF)=2.96×10^{-6} *5* B(E2)(W.u.)=2.3 *+12−7*
		1759.21[e] *15*	100[e] *5*	2505.753	4^+	E2(+M3)	−0.08 *+3−7*	0.000270 *4*	α=0.000270 *4*; α(K)=6.57×10^{-5} *22*; α(L)=6.39×10^{-6} *21*; α(M)=9.0×10^{-7} *3*; α(N+..)=0.000197 *4* α(N)=3.89×10^{-8} *13*; α(IPF)=0.000197 *4* B(E2)(W.u.)=(5.0 *+24−13*); B(M3)(W.u.)=(7.E+4 *+7−6*) δ: other: −0.1 *+4−2* from ^{58}Ni(α,2pγ).
4294.5		1788.9[&] *4*	67[&] *17*	2505.753	4^+				
		2961.8[&] *4*	100[&] *17*	1332.514	2^+				
4300.8		1181[g]		3119.87	4^+				
		1795[g]		2505.753	4^+				
4318.58	2^+	1692.45[i] *8*	37[i] *2*	2626.06	3^+				
		1813.5[i] *5*	21[i] *2*	2505.753	4^+				
		2985.97[i] *7*	100[i] *3*	1332.514	2^+				
		4318.52[i] *11*	41[i] *2*	0.0	0^+				
4335.52	2	1829.9[i] *4*	6[i] *2*	2505.753	4^+				
		2176.84[i] *4*	100[i] *3*	2158.632	2^+				
		3002.5[i] *4*	9[i] *2*	1332.514	2^+				
		4335.37[i] *23*	31[i] *3*	0.0	0^+				
4341	(0^+)	1217[c] *5*	43[c]	3123.698	2^+				
		2182[c] *5*	100[c]	2158.632	2^+				
4355.56	2^+	3024[ak]	100[a]	1332.514	2^+				
4400.0		700[gk]		3702.9	4^+				
		1130[g]		3269.19	2^+				
		1895[g]		2505.753	4^+				
4407.46	5^+	241.8 *1*	45 *6*	4165.50	5^+	D			
		676.6 *2*	100 *10*	3730.82	4^+	M1+E2		0.00056 *11*	α=0.00056 *11*; α(K)=0.00050 *10*; α(L)=4.9×10^{-5} *10*; α(M)=7.0×10^{-6} *14*; α(N+..)=3.0×10^{-7} *6* α(N)=3.0×10^{-7} *6*
		736.4 *4*	61 *10*	3671.16	4^+	M1+E2		0.00045 *8*	α=0.00045 *8*; α(K)=0.00041 *7*; α(L)=4.0×10^{-5} *7*; α(M)=5.6×10^{-6} *10*; α(N+..)=2.4×10^{-7} *4* α(N)=2.4×10^{-7} *4*
		1288.3 *4*	13 *3*	3119.87	4^+	M1+E2		0.000151 *11*	α=0.000151 *11*; α(K)=0.000116 *7*; α(L)=1.13×10^{-5} *7*;

$^{60}_{28}Ni_{32}$-21

γ(^{60}Ni) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	α[†]	Comments
								α(M)=1.59×10^{-6} *10*; α(N+..)=2.2×10^{-5} *4* α(N)=6.9×10^{-8} *4*; α(IPF)=2.2×10^{-5} *4*
4407.46	5$^+$	1781.3 *3*	29 *3*	2626.06	3$^+$	E2	0.000278 *4*	α=0.000278 *4*; α(K)=6.34×10^{-5} *9*; α(L)=6.16×10^{-6} *9*; α(M)=8.68×10^{-7} *13*; α(N+..)=0.000208 *3* α(N)=3.76×10^{-8} *6*; α(IPF)=0.000208 *3*
		1901.70 *15*	48 *6*	2505.753	4$^+$			
4450.7		1945[g]		2505.753	4$^+$			
		3118[g]		1332.514	2$^+$			
4493.16	2$^+$	758.5[i] *4*	8[i] *2*	3734.44	2$^+$			
		1306.5[i] *5*	7[i] *2*	3185.98	(3$^+$)			
		2334.4[i] *3*	12[i] *2*	2158.632	2$^+$			
		3160.60[i] *6*	100[i] *3*	1332.514	2$^+$			
		4494.0[a] *7*	6.8[a] *14*	0.0	0$^+$			
4534.14	2$^+$	2028.5[i] *5*	63[i] *17*	2505.753	4$^+$			
		2375.6[i] *3*	100[i] *14*	2158.632	2$^+$			
		3203[ak]	54[a] *18*	1332.514	2$^+$			
		4536[ak]	≤10[a]	0.0	0$^+$			
4547.96	1$^+$,2$^+$	813.48[i] *7*	20[i] *1*	3734.44	2$^+$			
		1154.82[i] *12*	13[i] *1*	3393.14	2$^+$			
		1354.08[i] *9*	19[i] *2*	3193.87	1$^+$			
		1424.24[i] *4*	72[i] *2*	3123.698	2$^+$			
		2263.17[i] *4*	100[i] *2*	2284.80	0$^+$			
		2389.25[i] *5*	86[i] *2*	2158.632	2$^+$			
		3215.27[i] *8*	35[i] *2*	1332.514	2$^+$			
		4548.2[i] *3*	47[i] *5*	0.0	0$^+$			
4577.45	2$^+$	1308.16[i] *25*	29[i] *4*	3269.19	2$^+$			
		2418.65[i] *20*	28[i] *4*	2158.632	2$^+$			
		3244.90[i] *9*	100[i] *4*	1332.514	2$^+$			
		4577.37[i] *14*	95[i] *6*	0.0	0$^+$			
4579.0	(4$^+$)	1952.9 *5*	100	2626.06	3$^+$	M1+E2	0.00032 *3*	α=0.00032 *3*; α(K)=5.21×10^{-5} *15*; α(L)=5.05×10^{-6} *15*; α(M)=7.11×10^{-7} *21*; α(N+..)=0.00026 *3* α(N)=3.09×10^{-8} *9*; α(IPF)=0.00026 *3*
4760.23	1,2	1491.5[i] *3*	31[i] *6*	3269.19	2$^+$			
		1636.42[i] *13*	85[i] *6*	3123.698	2$^+$			
		2601.5[i] *4*	26[i] *6*	2158.632	2$^+$			
		3428.0[i] *4*	100[i] *3*	1332.514	2$^+$			
		4760.1[i] *4*	56[i] *7*	0.0	0$^+$			
4768		1644[c] *5*	100[c]	3123.698	2$^+$			
		2142[c] *5*	82[c]	2626.06	3$^+$			
4779.13		667.4[i] *5*	6[i] *3*	4111.96	2$^+$			

$^{60}_{28}$Ni$_{32}$-22

Adopted Levels, Gammas (continued)

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	α[†]	Comments
4779.13		1385.97[i] *14*	28[i] *4*	3393.14	2^+			
		1585.33[i] *13*	54[i] *4*	3193.87	1^+			
		2493.8[i] *3*	26[i] *2*	2284.80	0^+			
		2620.40[i] *8*	100[i] *4*	2158.632	2^+			
		3446.77[i] *17*	65[i] *6*	1332.514	2^+			
4800.0		2641.3[&k] *5*	100[&]	2158.632	2^+			
4843.93	2^+	3511.07[i] *18*	45[i] *2*	1332.514	2^+			
		4843.76[i] *9*	100[i] *4*	0.0	0^+	E2	0.001458 *21*	α=0.001458 *21*; α(K)=1.228×10^{-5} *18*; α(L)=1.185×10^{-6} *17*; α(M)=1.669×10^{-7} *24* α(N)=7.27×10^{-9} *11*; α(IPF)=0.001444 *21* Mult.: From (γ,γ'),(pol γ,γ').
4848.9	1,2,3	1579.5[a] *6*	1.0×10^2[a] *4*	3269.19	2^+			
		3518[a] *2*	2.×10^1[a] *1*	1332.514	2^+			
4859		3527[c] *5*	61[c]	1332.514	2^+			
		4859[c] *5*	100[c]	0.0	0^+			
4928.98		1194.4[i] *5*	38[i] *13*	3734.44	2^+			
		2770.5[i] *3*	98[i] *13*	2158.632	2^+			
		3596.4[i] *4*	100[i] *15*	1332.514	2^+			
4953.36		841.2[i] *3*	14[i] *3*	4111.96	2^+			
		913.63[i] *14*	40[i] *4*	4039.89	3^-			
		1684.4[i] *3*	26[i] *5*	3269.19	2^+			
		3620.64[i] *14*	100[i] *7*	1332.514	2^+			
4958	4^+	2452[c] *5*	100[c]	2505.753	4^+			
		3626[c] *5*	67[c]	1332.514	2^+			
4970.6		1299[c] *5*	25[c]	3671.16	4^+			
		2344[c] *5*	100[c]	2626.06	3^+			
		3638[g]		1332.514	2^+			
4986.00	(6^+)	578.3 *3*	17 *4*	4407.46	5^+	M1+E2	0.00084 *22*	α=0.00084 *22*; α(K)=0.00076 *20*; α(L)=7.5×10^{-5} *20*; α(M)=1.1×10^{-5} *3*; α(N+..)=4.5×10^{-7} *11* α(N)=4.5×10^{-7} *11*
		720.9 *2*	51 *4*	4265.00	6^+	D		
		820.5 *2*	13.2 *19*	4165.50	5^+	M1+E2	0.00035 *5*	α=0.00035 *5*; α(K)=0.00031 *5*; α(L)=3.1×10^{-5} *5*; α(M)=4.3×10^{-6} *7*; α(N+..)=1.9×10^{-7} *3* α(N)=1.9×10^{-7} *3*
		1255.8 *2*	9.4 *19*	3730.82	4^+	E2	0.0001623 *23*	α=0.0001623 *23*; α(K)=0.0001291 *18*; α(L)=1.260×10^{-5} *18*; α(M)=1.774×10^{-6} *25* α(N)=7.64×10^{-8} *11*; α(IPF)=1.88×10^{-5} *3* B(E2)(W.u.)=0.5 *+4−5*
		1314.5 *2*	34 *4*	3671.16	4^+	E2	0.0001619 *23*	α=0.0001619 *23*; α(K)=0.0001170 *17*; α(L)=1.141×10^{-5} *16*; α(M)=1.606×10^{-6} *23*

$^{60}_{28}Ni_{32}$-23

Adopted Levels, Gammas (continued)

γ(^{60}Ni) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	α[†]	Comments
								α(N)=6.93×10^{-8} 10; α(IPF)=3.18×10^{-5} 5 B(E2)(W.u.)=1.5 +11−15
4986.00	(6$^+$)	1867.0 3	11.3 19	3119.87	4$^+$	E2	0.000312 5	α=0.000312 5; α(K)=5.80×10^{-5} 9; α(L)=5.63×10^{-6} 8; α(M)=7.94×10^{-7} 12; α(N+..)=0.000248 4 α(N)=3.44×10^{-8} 5; α(IPF)=0.000248 4 B(E2)(W.u.)=0.09 +7−9
		2480.6 3	100 6	2505.753	4$^+$	E2	0.000584 9	α=0.000584 9; α(K)=3.49×10^{-5} 5; α(L)=3.38×10^{-6} 5; α(M)=4.76×10^{-7} 7; α(N+..)=0.000546 8 α(N)=2.07×10^{-8} 3; α(IPF)=0.000546 8 B(E2)(W.u.)=0.18 +13−18
5014.45	(5$^-$)	749.5 3	3 3	4265.00	6$^+$	E1	0.000189 3	α=0.000189 3; α(K)=0.0001700 24; α(L)=1.655×10^{-5} 24; α(M)=2.33×10^{-6} 4; α(N+..)=1.002×10^{-7} α(N)=1.002×10^{-7} 14
		828.3 3	6 3	4186.19	(4$^+$)	(E1)	0.0001528 22	α=0.0001528 22; α(K)=0.0001375 20; α(L)=1.337×10^{-5} 19; α(M)=1.88×10^{-6} 3 α(N)=8.11×10^{-8} 12
		848.9 1	3 3	4165.50	5$^+$	E1	0.0001452 21	α=0.0001452 21; α(K)=0.0001307 19; α(L)=1.271×10^{-5} 18; α(M)=1.79×10^{-6} 3 α(N)=7.71×10^{-8} 11
		1283.8 4	9 3	3730.82	4$^+$	E1	0.0001733 25	α=0.0001733 25; α(K)=5.97×10^{-5} 9; α(L)=5.78×10^{-6} 9; α(M)=8.14×10^{-7} 12; α(N+..)=0.0001070 1 α(N)=3.52×10^{-8} 5; α(IPF)=0.0001070 16
		1343.3 2	55 6	3671.16	4$^+$	E1	0.000208 3	α=0.000208 3; α(K)=5.52×10^{-5} 8; α(L)=5.35×10^{-6} 8; α(M)=7.53×10^{-7} 11; α(N+..)=0.0001466 21 α(N)=3.26×10^{-8} 5; α(IPF)=0.0001465 21
		1894.7 3	100 10	3119.87	4$^+$	E1	0.000595 9	α=0.000595 9; α(K)=3.18×10^{-5} 5; α(L)=3.07×10^{-6} 5; α(M)=4.33×10^{-7} 6; α(N+..)=0.000560 8 α(N)=1.88×10^{-8} 3; α(IPF)=0.000560 8
		2508.7 4	87 10	2505.753	4$^+$	E1	0.000989 14	α=0.000989 14; α(K)=2.12×10^{-5} 3; α(L)=2.05×10^{-6} 3; α(M)=2.88×10^{-7} 4; α(N+..)=0.000966 14 α(N)=1.251×10^{-8} 18; α(IPF)=0.000966 14
5048.3	1,2	2889.6[a] 7	1.0×10^2[a] 4	2158.632	2$^+$			
		3716[ak]	≤35[a]	1332.514	2$^+$			
		5048[a] 3	9[a] 5	0.0	0$^+$			
5065.02	(1$^-$)	3732.23[i] 22	30[i] 3	1332.514	2$^+$			
		5064.79[i] 7	100[i] 3	0.0	0$^+$			
5091.1		2465[f]	100[f]	2626.06	3$^+$			
5106		1435[c] 5	100[c]	3671.16	4$^+$			
		2600[c] 5	82[c]	2505.753	4$^+$			
5120.7	4$^+$	2615[g]		2505.753	4$^+$			
		3788[g]		1332.514	2$^+$			

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$\gamma(^{60}$Ni) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ	E_f	J_f^π	Mult.[#]	δ[@]	α[†]	Comments
5127.16		1392.3[i] *5*	18[i] *7*	3734.44	2^+				
		3794.8[i] *4*	100[i] *13*	1332.514	2^+				
5133		3800[c] *5*	100[c]	1332.514	2^+				
5148.51	6^+	740.9 *2*	100 *10*	4407.46	5^+	M1+E2	+0.4 *1*	0.000391 *11*	α=0.000391 *11*; α(K)=0.000351 *10*; α(L)=3.44×10^{-5} *10*; α(M)=4.84×10^{-6} *14*; α(N+..)=2.09×10^{-7} *6* α(N)=2.09×10^{-7} *6*
		883.5 *1*	28.6 *24*	4265.00	6^+	D			
		982.9 *3*	11.9 *24*	4165.50	5^+	M1+E2		0.000229 *23*	α=0.000229 *23*; α(K)=0.000206 *21*; α(L)=2.01×10^{-5} *21*; α(M)=2.8×10^{-6} *3*; α(N+..)=1.22×10^{-7} *12* α(N)=1.22×10^{-7} *12*
		1477.3 *4*	4.8 *24*	3671.16	4^+	E2		0.000181 *3*	α=0.000181 *3*; α(K)=9.17×10^{-5} *13*; α(L)=8.92×10^{-6} *13*; α(M)=1.257×10^{-6} *18*; α(N+..)=7.87×10^{-5} *12* α(N)=5.43×10^{-8} *8*; α(IPF)=7.86×10^{-5} *12*
		2029.0 *5*	7.1 *24*	3119.87	4^+	E2		0.000381 *6*	α=0.000381 *6*; α(K)=4.98×10^{-5} *7*; α(L)=4.83×10^{-6} *7*; α(M)=6.80×10^{-7} *10*; α(N+..)=0.000326 *5* α(N)=2.95×10^{-8} *5*; α(IPF)=0.000326 *5*
		2643.0 *4*	60 *7*	2505.753	4^+	E2		0.000657 *10*	α=0.000657 *10*; α(K)=3.14×10^{-5} *5*; α(L)=3.04×10^{-6} *5*; α(M)=4.28×10^{-7} *6*; α(N+..)=0.000622 *9* α(N)=1.86×10^{-8} *3*; α(IPF)=0.000622 *9*
5174		2548[c] *5*	100[c]	2626.06	3^+				
5191.7		927[h]	100	4265.00	6^+				
5205		2699[c] *5*	100[c]	2505.753	4^+				
5236.20	$5^{(+)}$	2116.0 *1*	100	3119.87	4^+	D+Q			
5244	4^+	2120[c] *5*	100[c]	3123.698	2^+				
5288.55		1248.86[i] *15*	100[i] *12*	4039.89	3^-				
		3955.2[i] *6*	69[i] *17*	1332.514	2^+				
		5287.8[i] *7*	61[i] *14*	0.0	0^+				
5318		2812[c] *5*	100[c]	2505.753	4^+				
5348.79	7^-	200.2 *1*	5.3 *4*	5148.51	6^+	E1		0.00621 *9*	α=0.00621 *9*; α(K)=0.00558 *8*; α(L)=0.000547 *8*; α(M)=7.67×10^{-5} *11*; α(N+..)=3.22×10^{-6} *5* α(N)=3.22×10^{-6} *5* B(E1)(W.u.)=8.7×10^{-6} *10*
		334.2 *1*	16.9 *8*	5014.45	(5^-)	E2		0.00636 *9*	α=0.00636 *9*; α(K)=0.00570 *8*; α(L)=0.000575 *8*; α(M)=8.06×10^{-5} *12*; α(N+..)=3.30×10^{-6} *5* α(N)=3.30×10^{-6} *5* B(E2)(W.u.)=4.9 *5*
		362.8 *1*	7.6 *6*	4986.00	(6^+)	E1		0.001128 *16*	α=0.001128 *16*; α(K)=0.001014 *15*; α(L)=9.92×10^{-5} *14*; α(M)=1.395×10^{-5} *20*; α(N+..)=5.93×10^{-7} α(N)=5.93×10^{-7} *9* B(E1)(W.u.)=2.10×10^{-6} *25*
		1083.6 *2*	100.0 *4*	4265.00	6^+	E1		9.00×10^{-5} *13*	α=9.00×10^{-5} *13*; α(K)=8.10×10^{-5} *12*; α(L)=7.86×10^{-6}

$^{60}_{28}Ni_{32}$-25

Adopted Levels, Gammas (continued)

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	δ[@]	α[†]	Comments
									11; α(M)=1.106×10^{-6} *16*; α(N+..)=4.78×10^{-8} *7* α(N)=4.78×10^{-8} *7* B(E1)(W.u.)=1.04×10^{-6} *9*
5348.79	7$^-$	2843.0 *1*	3.7 *4*	2505.753	4$^+$	E3		0.000528 *8*	α=0.000528 *8*; α(K)=4.11×10^{-5} *6*; α(L)=3.99×10^{-6} *6*; α(M)=5.62×10^{-7} *8*; α(N+..)=0.000482 *7* α(N)=2.44×10^{-8} *4*; α(IPF)=0.000482 *7* B(E3)(W.u.)=0.42 *6*
5379		2255[c] *5*	100[c]	3123.698	2$^+$				
5410.8		2905[f]	100[f]	2505.753	4$^+$				
5446.98	2$^+$	1091.42[i] *9*	94[i] *5*	4355.56	2$^+$				
		1575.84[i] *13*	100[i] *7*	3871.050	2$^+$				
		3288.5[i] *3*	27[i] *7*	2158.632	2$^+$				
		4114.4[i] *6*	99[i] *12*	1332.514	2$^+$				
5449.5	6$^+$	2944.4 *7*	100	2505.753	4$^+$	E2		0.000787 *11*	α=0.000787 *11*; α(K)=2.62×10^{-5} *4*; α(L)=2.54×10^{-6} *4*; α(M)=3.58×10^{-7} *5*; α(N+..)=0.000758 *11* α(N)=1.554×10^{-8} *22*; α(IPF)=0.000758 *11*
5476.04		1888.4[i] *3*	100[i] *13*	3587.72	0$^+$				
		2282.0[i] *3*	81[i] *13*	3193.87	1$^+$				
5530	(2$^+$)	2904[c] *5*	67[c]	2626.06	3$^+$				
		3371[c] *5*	100[c]	2158.632	2$^+$				
5612.40		851.9[i] *3*	4.5[i] *7*	4760.23	1,2				
		1064.2[i] *4*	4.8[i] *9*	4547.96	1$^+$,2$^+$				
		1592.53[i] *4*	100[i] *3*	4019.886	1$^+$				
		1741.3[i] *5*	3.0[i] *9*	3871.050	2$^+$				
		1878.0[i] *4*	5[i] *1*	3734.44	2$^+$				
		2488.73[i] *10*	20[i] *1*	3123.698	2$^+$				
		3453.67[i] *11*	30[i] *1*	2158.632	2$^+$				
		4279.8[i] *4*	7.7[i] *14*	1332.514	2$^+$				
		5611.8[i] *4*	8.2[i] *12*	0.0	0$^+$				
5663.03	7$^+$	514.4 *2*	11.1 *19*	5148.51	6$^+$	M1+E2		0.0012 *4*	α=0.0012 *4*; α(K)=0.0010 *4*; α(L)=0.00010 *4*; α(M)=1.5×10^{-5} *5*; α(N+..)=6.2×10^{-7} *18* α(N)=6.2×10^{-7} *18*
		677.7 *2*	100 *7*	4986.00	(6$^+$)	M1+E2	+0.18 *+17−16*	0.000454 *19*	α=0.000454 *19*; α(K)=0.000408 *17*; α(L)=4.00×10^{-5} *17*; α(M)=5.63×10^{-6} *23*; α(N+..)=2.43×10^{-7} *1* α(N)=2.43×10^{-7} *10* B(M1)(W.u.)=0.048 *+21−48*; B(E2)(W.u.)=6 *+12−6*
		1255.1 *3*	22.2 *19*	4407.46	5$^+$	E2		0.0001624 *23*	α=0.0001624 *23*; α(K)=0.0001293 *19*; α(L)=1.261×10^{-5} *18*; α(M)=1.776×10^{-6} *25* α(N)=7.65×10^{-8} *11*; α(IPF)=1.86×10^{-5} *3* B(E2)(W.u.)=2.0 *+9−20*
		1397.7 *2*	69 *6*	4265.00	6$^+$	M1(+E2)	−0.12 *13*	0.0001438 *23*	α=0.0001438 *23*; α(K)=9.35×10^{-5} *14*;

From ENSDF

$^{60}_{28}Ni_{32}$-26

Adopted Levels, Gammas (continued)

γ(^{60}Ni) (continued)

E_i(level)	J^π_i	E_γ‡	I_γ	E_f	J^π_f	Mult.#	δ@	α†	Comments
									α(L)=9.08×10^{-6} *14*; α(M)=1.280×10^{-6} *19*; α(N+..)=3.99×10^{-5}

$^{60}_{28}$Ni$_{32}$-27

γ(^{60}Ni) (continued)

E_i(level)	J_i^π	E_γ‡	I_γ	E_f	J_f^π	Mult.$^{\#}$	$\delta$$^{@}$	α†	Comments
									α(N)=5.56×10^{-8} *9*; α(IPF)=3.98×10^{-5} *9* B(M1)(W.u.)=(0.0038 *+17−38*); B(E2)(W.u.)=(0.05 *+12−5*)
5663.03	7$^+$	1498.0 *4*	3.7 *19*	4165.50	5$^+$	E2		0.000185 *3*	α=0.000185 *3*; α(K)=8.91×10^{-5} *13*; α(L)=8.67×10^{-6} *13*; α(M)=1.222×10^{-6} *18*; α(N+..)=8.62×10^{-5} *13* α(N)=5.28×10^{-8} *8*; α(IPF)=8.62×10^{-5} *13* B(E2)(W.u.)=0.14 *+10−14*
5672.36		2478.42^{i} *7*	100^{i} *4*	3193.87	1$^+$				
		3046.7^{i} *7*	13^{i} *4*	2626.06	3$^+$				
		3513.6^{i} *3*	56^{i} *6*	2158.632	2$^+$				
5710.79		1632.99^{i} *18*	15^{i} *1*	4077.99	1$^+$,2$^+$				
		2317.65^{i} *20*	13^{i} *2*	3393.14	2$^+$				
		2392.6^{i} *3*	11^{i} *1*	3317.829	0$^+$				
		2517.00^{i} *9*	68^{i} *2*	3193.87	1$^+$				
		2586.98^{i} *12*	20^{i} *1*	3123.698	2$^+$				
		3426.3^{i} *5*	26^{i} *7*	2284.80	0$^+$				
		3551.94^{i} *14*	36^{i} *2*	2158.632	2$^+$				
		5710.52^{i} *10*	100^{i} *4*	0.0	0$^+$				
5780.5		3153.6$^{\&}$ *7*	82$^{\&}$ *13*	2626.06	3$^+$				
		3275.4$^{\&}$ *7*	100$^{\&}$ *13*	2505.753	4$^+$				
5785.1	(7$^+$)	799.0^{ek} *2*	100^{e}	4986.00	(6$^+$)	D(+Q)	−0.07 *+9−27*		
5799	2$^+$	3293^{d} *5*		2505.753	4$^+$				
		4467^{d} *5*		1332.514	2$^+$				
5830.8		2711^{g}		3119.87	4$^+$				
		4498^{g}		1332.514	2$^+$				
5859.9		3700.9^{i} *9*	100^{i}	2158.632	2$^+$				
5878.05		2684.19^{i} *12*	100^{i} *5*	3193.87	1$^+$				
		4545.9^{i} *5*	45^{i} *9*	1332.514	2$^+$				
5901.69	6$^-$	1637.0 *1*	38 *8*	4265.00	6$^+$	E1		0.000411 *6*	α=0.000411 *6*; α(K)=3.98×10^{-5} *6*; α(L)=3.86×10^{-6} *6*; α(M)=5.43×10^{-7} *8*; α(N+..)=0.000366 *6* α(N)=2.35×10^{-8} *4*; α(IPF)=0.000366 *6*
		1736.0 *1*	100 *8*	4165.50	5$^+$	E1		0.000483 *7*	α=0.000483 *7*; α(K)=3.63×10^{-5} *5*; α(L)=3.52×10^{-6} *5*; α(M)=4.95×10^{-7} *7*; α(N+..)=0.000442 *7* α(N)=2.15×10^{-8} *3*; α(IPF)=0.000442 *7*
5902.44		2633.3^{i} *3*	18^{i} *3*	3269.19	2$^+$				
		3276.32^{i} *20*	24^{i} *3*	2626.06	3$^+$				
		3743.71^{i} *13*	100^{i} *5*	2158.632	2$^+$				
5918.54		1562.8^{i} *3*	100^{i} *10*	4355.56	2$^+$				

$^{60}_{28}\mathrm{Ni}_{32}$-28

Adopted Levels, Gammas (continued)

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	δ[@]	α[†]	Comments
5918.54		2525.4[i] *3*	83[i] *15*	3393.14	2^+				
5931.1	1	5930.8[j] *11*	100[j]	0.0	0^+	[j]			
5967.8		1474.6[i] *3*	100[i] *13*	4493.16	2^+				
		5967.5[i] *8*	29[i] *11*	0.0	0^+				
6066.72		1532.65[i] *12*	60[i] *6*	4534.14	2^+				
		2797.7[i] *5*	23[i] *6*	3269.19	2^+				
		3440.37[i] *17*	100[i] *9*	2626.06	3^+				
		6067.2[i] *8*	15[i] *6*	0.0	0^+				
6076.6	(8)	727[h]		5348.79	7^-				
6111.5		963[h]		5148.51	6^+				
6112.43	7^+	963.7 *3*	100 *7*	5148.51	6^+	M1+E2	+0.3 *2*	0.000219 *7*	α=0.000219 *7*; α(K)=0.000197 *6*; α(L)=1.92×10^{-5} *6*; α(M)=2.70×10^{-6} *9*; α(N+..)=1.17×10^{-7} *4* α(N)=1.17×10^{-7} *4*
		1847.2 *5*	61 *7*	4265.00	6^+	M1+E2		0.00028 *3*	α=0.00028 *3*; α(K)=5.76×10^{-5} *18*; α(L)=5.59×10^{-6} *18*; α(M)=7.87×10^{-7} *25*; α(N+..)=0.000215 *24* α(N)=3.42×10^{-8} *11*; α(IPF)=0.000215 *24*
		1946.6 *5*	29 *4*	4165.50	5^+	E2		0.000346 *5*	α=0.000346 *5*; α(K)=5.37×10^{-5} *8*; α(L)=5.21×10^{-6} *8*; α(M)=7.34×10^{-7} *11*; α(N+..)=0.000286 *4* α(N)=3.18×10^{-8} *5*; α(IPF)=0.000286 *4*
6181.0	1^-	4848.4 *14*	10 *4*	1332.514	2^+				
		6180.6 *7*	100 *1*	0.0	0^+	E1			α(IPF)=0.00233 *4*
6229.3	(2^+)	6229.0[j] *11*	100[j]	0.0	0^+	(E2)[j]			α(IPF)=0.00180 *3*
6239.2		4906.1[i] *5*	100[i]	1332.514	2^+				
6278.34	(6^-)	1042.0 *1*	75 *33*	5236.20	$5^{(+)}$	(E1)		9.68×10^{-5} *14*	α=9.68×10^{-5} *14*; α(K)=8.71×10^{-5} *13*; α(L)=8.46×10^{-6} *12*; α(M)=1.191×10^{-6} *17*; α(N+..)=5.14×10^{-8} *8* α(N)=5.14×10^{-8} *8*
		1264.0[g] *1*	100 *33*	5014.45	(5^-)	(M1+E2)		0.000151 *11*	α=0.000151 *11*; α(K)=0.000120 *8*; α(L)=1.17×10^{-5} *8*; α(M)=1.65×10^{-6} *11*; α(N+..)=1.8×10^{-5} *3* α(N)=7.1×10^{-8} *5*; α(IPF)=1.8×10^{-5} *3*
6327.21	2^+	1568.0[i] *5*	14[i] *3*	4760.23	1,2				
		2320.7[i] *4*	25[i] *4*	4006.444	2^+				
		3058.0[i] *7*	16[i] *4*	3269.19	2^+				
		4168.32[i] *19*	100[i] *8*	2158.632	2^+				
6362.05		749.7[i] *3*	100[i] *12*	5612.40					
		3167.7[i] *4*	90[i] *10*	3193.87	1^+				
6382.4	1	6382.3[i] *5*	100[i]	0.0	0^+				
6461.10	8^+	348.7 *2*	9 *3*	6112.43	7^+	M1+E2		0.0037 *18*	α=0.0037 *18*; α(K)=0.0034 *16*; α(L)=0.00034 *16*; α(M)=4.7×10^{-5} *23*; α(N+..)=2.0×10^{-6} *9* α(N)=2.0×10^{-6} *9*
		798.1 *2*	100 *5*	5663.03	7^+	M1+E2	+0.45 *5*	0.000335 *6*	α=0.000335 *6*; α(K)=0.000301 *6*; α(L)=2.94×10^{-5} *6*;

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γ(^{60}Ni) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	α[†]	Comments
								α(M)=4.15×10^{-6} *8*; α(N+..)=1.79×10^{-7} *3* α(N)=1.79×10^{-7} *3* B(M1)(W.u.)=0.019 *+8−19*; B(E2)(W.u.)=11 *+6−11*
6461.10	8$^+$	1312.4 *4*	27 *3*	5148.51	6$^+$	E2	0.0001618 *23*	α=0.0001618 *23*; α(K)=0.0001174 *17*; α(L)=1.145×10^{-5} *16*; α(M)=1.612×10^{-6} *23* α(N)=6.95×10^{-8} *10*; α(IPF)=3.13×10^{-5} *5* B(E2)(W.u.)=1.5 *+7−15*
		1475.0 *4*	16 *1*	4986.00	(6$^+$)	E2	0.000180 *3*	α=0.000180 *3*; α(K)=9.20×10^{-5} *13*; α(L)=8.95×10^{-6} *13*; α(M)=1.261×10^{-6} *18*; α(N+..)=7.79×10^{-5} *11* α(N)=5.45×10^{-8} *8*; α(IPF)=7.78×10^{-5} *11* B(E2)(W.u.)=0.49 *+21−49*
		2195.9 *5*	6 *1*	4265.00	6$^+$	E2	0.000456 *7*	α=0.000456 *7*; α(K)=4.32×10^{-5} *6*; α(L)=4.18×10^{-6} *6*; α(M)=5.89×10^{-7} *9*; α(N+..)=0.000408 *6* α(N)=2.56×10^{-8} *4*; α(IPF)=0.000408 *6* B(E2)(W.u.)=0.025 *+12−25*
6465.25	1$^-$	1621.2[i] *5*	19[i] *6*	4843.93	2$^+$			
		2578.2[i] *5*	16[i] *5*	3887.36	2$^+$			
		5132.6[i] *5*	31[i] *7*	1332.514	2$^+$			
		6464.9[i] *3*	100[i] *6*	0.0	0$^+$	E1		α(IPF)=0.00240 *4* Mult.: From (γ,γ'),(pol γ,γ').
6489.28		3369.4[i] *4*	46[i] *8*	3119.87	4$^+$			
		3983.6[i] *4*	100[i] *12*	2505.753	4$^+$			
		4204.0[i] *7*	42[i] *12*	2284.80	0$^+$			
6515.0	1$^+$	6514.6[j] *9*	100[j]	0.0	0$^+$	M1[j]		α(IPF)=0.001745 *25*
6516.72		2198.1[i] *4*	100[i] *19*	4318.58	2$^+$			
		2496.9[i] *3*	70[i] *12*	4019.886	1$^+$			
6567.33		2547.35[i] *21*	100[i]	4019.886	1$^+$			
6587.6	1$^-$	4302.0[j] *11*	30[j] *6*	2284.80	0$^+$	[j]		
		5254.7[j] *10*	19[j] *6*	1332.514	2$^+$	[j]		
		6587.6[j] *8*	100[j] *3*	0.0	0$^+$	E1[j]		α(IPF)=0.00243 *4*
6647.17		2607.10[i] *22*	55[i] *7*	4039.89	3$^-$			
		2627.4[i] *3*	39[i] *6*	4019.886	1$^+$			
		3027.86[i] *16*	100[i] *8*	3619.46	3$^+$			
		4021.4[i] *5*	100[i] *11*	2626.06	3$^+$			
6672.4	(9)	595[h]		6076.6	(8)			
6718.5	1$^-$	6718.1[j] *10*	100[j]	0.0	0$^+$	E1[j]		α(IPF)=0.00246 *4*
6736.5	(1)	4577.7[j] *13*	100[j] *21*	2158.632	2$^+$	[j]		
		6736.1[j] *16*	85[j] *21*	0.0	0$^+$	[j]		
6756.4		2831.3[i] *6*	78[i] *22*	3925.18	2$^+$,3$^+$			
		3487.1[i] *4*	100[i] *22*	3269.19	2$^+$			

$^{60}_{28}$Ni$_{32}$-30

Adopted Levels, Gammas (continued)

$\gamma(^{60}\mathrm{Ni})$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	α[†]	Comments
6761.39	$7^{(+)}$	861.4 *4*	30 *10*	5901.69	6^-	(E1)	0.0001409 *20*	α=0.0001409 *20*; α(K)=0.0001268 *18*; α(L)=1.233×10^{-5} *18*;

$^{60}_{28}\mathrm{Ni}_{32}$-31

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ	E_f	J^π_f	Mult.#	δ@	α†	Comments
									α(M)=1.736×10^{-6} 25 α(N)=7.48×10^{-8} 11
6761.39	7$^{(+)}$	1525.0 1	30 10	5236.20	5$^{(+)}$	E2		0.000192 3	α=0.000192 3; α(K)=8.60×10^{-5} 12; α(L)=8.36×10^{-6} 12; α(M)=1.178×10^{-6} 17; α(N+..)=9.66×10^{-5} 14 α(N)=5.09×10^{-8} 8; α(IPF)=9.65×10^{-5} 14
		2498.5 6	100 10	4265.00	6$^+$	(M1+E2)		0.00055 5	α=0.00055 5; α(K)=3.39×10^{-5} 8; α(L)=3.28×10^{-6} 8; α(M)=4.62×10^{-7} 11; α(N+..)=0.00051 5 α(N)=2.01×10^{-8} 5; α(IPF)=0.00051 5
6810.95	9$^-$	1461.5^e 2	100^e	5348.79	7$^-$	E2(+M3)	−0.02 +30−7	0.000177 12	α=0.000177 12; α(K)=9.4×10^{-5} 15; α(L)=9.1×10^{-6} 15; α(M)=1.29×10^{-6} 21; α(N+..)=7.3×10^{-5} 5 α(N)=5.6×10^{-8} 9; α(IPF)=7.3×10^{-5} 5 B(E2)(W.u.)=(11 6); B(M3)(W.u.)=(1.4×10^4 +434−14) δ: other: −0.10 +20−15 from ^{58}Ni(α,2pγ).
6834.92		3517.3^i 3	93^i 12	3317.829	0$^+$				
		3641.1^i 4	100^i 14	3193.87	1$^+$				
6835.18		3517.3^i 3	93^i 11	3317.829	0$^+$				
		3641.1^i 4	100^i 13	3193.87	1$^+$				
6837.2	8$^-$	1487.8	100	5348.79	7$^-$	M1+E2		0.000169 15	α=0.000169 15; α(K)=8.7×10^{-5} 4; α(L)=8.4×10^{-6} 4; α(M)=1.19×10^{-6} 6; α(N+..)=7.3×10^{-5} 10 α(N)=5.14×10^{-8} 22; α(IPF)=7.3×10^{-5} 10
6911.93	1$^+$	2593.3^i 4	15^i 4	4318.58	2$^+$				
		3040.5^i 4	31^i 6	3871.050	2$^+$				
		5578.7^i 6	22^i 6	1332.514	2$^+$				
		6911.7^i 3	100^i 7	0.0	0$^+$	M1			α(IPF)=0.00182 3 Mult.: From (γ,γ'),(pol γ,γ').
6950.4	(10)	278^h	100	6672.4	(9)				
6996.86		2152.6^i 3	100^i 15	4843.93	2$^+$				
		4370.7^i 5	71^i 12	2626.06	3$^+$				
7027.83	8$^+$	914.8 3	70 10	6112.43	7$^+$	M1+E2		0.00027 4	α=0.00027 4; α(K)=0.00024 3; α(L)=2.4×10^{-5} 3; α(M)=3.3×10^{-6} 4; α(N+..)=1.44×10^{-7} 16 α(N)=1.44×10^{-7} 16
		1365.0 2	100 10	5663.03	7$^+$	M1+E2		0.000153 12	α=0.000153 12; α(K)=0.000103 6; α(L)=1.00×10^{-5} 6; α(M)=1.41×10^{-6} 8; α(N+..)=3.9×10^{-5} 6 α(N)=6.1×10^{-8} 3; α(IPF)=3.9×10^{-5} 6
		1578.6 4	60 10	5449.5	6$^+$	E2		0.000208 3	α=0.000208 3; α(K)=8.02×10^{-5} 12; α(L)=7.80×10^{-6} 11; α(M)=1.099×10^{-6} 16; α(N+..)=0.0001184 α(N)=4.75×10^{-8} 7; α(IPF)=0.0001184 17
		1880.9 5	100 20	5148.51	6$^+$	E2		0.000318 5	α=0.000318 5; α(K)=5.72×10^{-5} 8; α(L)=5.56×10^{-6} 8; α(M)=7.83×10^{-7} 11; α(N+..)=0.000254 4 α(N)=3.39×10^{-8} 5; α(IPF)=0.000254 4
		2041.9 5	40 20	4986.00	(6$^+$)	E2		0.000387 6	α=0.000387 6; α(K)=4.92×10^{-5} 7; α(L)=4.77×10^{-6} 7;

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γ(^{60}Ni) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[‡]	I$_\gamma$	E$_f$	J$^\pi_f$	Mult.[#]	δ[@]	α[†]	Comments
									α(M)=6.72×10^{-7} *10*; α(N+..)=0.000332 *5* α(N)=2.91×10^{-8} *4*; α(IPF)=0.000332 *5*
7038.7	1$^-$	5705.6[j] *9*	64[j] *9*	1332.514	2$^+$	[j]			
		7038.7[j] *10*	100[j] *7*	0.0	0$^+$	E1[j]			α(IPF)=0.00253 *4*
7056.27		383[h]		6672.4	(9)				
		4430.3[i] *4*	100[i] *13*	2626.06	3$^+$				
		5723.0[i] *5*	80[i] *13*	1332.514	2$^+$				
7101.4	(10)	429[h]		6672.4	(9)				
7207.6		3129.6[i] *3*	100[i] *13*	4077.99	1$^+$,2$^+$				
		5875.2[i] *7*	52[i] *13*	1332.514	2$^+$				
7222.80		3603.4[i] *7*	61[i] *16*	3619.46	3$^+$				
		5889.9 *5*	100 *16*	1332.514	2$^+$				
7250.0	8$^+$	2986.5 *7*	100	4265.00	6$^+$	E2		0.000804 *12*	α=0.000804 *12*; α(K)=2.56×10^{-5} *4*; α(L)=2.48×10^{-6} *4*; α(M)=3.49×10^{-7} *5*; α(N+..)=0.000776 *11* α(N)=1.519×10^{-8} *22*; α(IPF)=0.000776 *11*
7316.13		1643.6[i] *4*	68[i] *14*	5672.36					
		3296.3[i] *3*	100[i] *14*	4019.886	1$^+$				
		5983.4[i] *5*	63[i] *14*	1332.514	2$^+$				
7339.68		1628.9[i] *4*	85[i] *16*	5710.79					
		2846.9[i] *5*	100[i] *20*	4493.16	2$^+$				
7360.97	(8)	2012.2 *5*	100	5348.79	7$^-$	(D+Q)			
7380.3	8$^+$	3114.7 *7*	100	4265.00	6$^+$	E2		0.000857 *12*	α=0.000857 *12*; α(K)=2.40×10^{-5} *4*; α(L)=2.32×10^{-6} *4*; α(M)=3.26×10^{-7} *5*; α(N+..)=0.000830 *12* α(N)=1.419×10^{-8} *20*; α(IPF)=0.000830 *12*
7414.16		3302.11[i] *24*	100[i]	4111.96	2$^+$				
7433.45	9$^+$	405.7 *2*	10 *2*	7027.83	8$^+$	M1+E2		0.0023 *10*	α=0.0023 *10*; α(K)=0.0021 *9*; α(L)=0.00021 *9*; α(M)=2.9×10^{-5} *12*; α(N+..)=1.2×10^{-6} *5* α(N)=1.2×10^{-6} *5*
		972.3 *2*	100 *10*	6461.10	8$^+$	M1+E2	+0.4 *2*	0.000217 *7*	α=0.000217 *7*; α(K)=0.000196 *6*; α(L)=1.91×10^{-5} *6*; α(M)=2.69×10^{-6} *9*; α(N+..)=1.16×10^{-7} *4* α(N)=1.16×10^{-7} *4*
		1321.1 *4*	32 *8*	6112.43	7$^+$	E2		0.0001620 *23*	α=0.0001620 *23*; α(K)=0.0001157 *17*; α(L)=1.128×10^{-5} *16*; α(M)=1.589×10^{-6} *23* α(N)=6.85×10^{-8} *10*; α(IPF)=3.34×10^{-5} *5*
		1770.6 *5*	4 *2*	5663.03	7$^+$	E2		0.000274 *4*	α=0.000274 *4*; α(K)=6.42×10^{-5} *9*; α(L)=6.23×10^{-6} *9*; α(M)=8.78×10^{-7} *13*; α(N+..)=0.000203 *3* α(N)=3.80×10^{-8} *6*; α(IPF)=0.000203 *3*
7465.66	(7$^-$)	2451.5 *6*	100	5014.45	(5$^-$)	E2		0.000571 *8*	α=0.000571 *8*; α(K)=3.56×10^{-5} *5*; α(L)=3.45×10^{-6} *5*; α(M)=4.86×10^{-7} *7*; α(N+..)=0.000532 *8* α(N)=2.11×10^{-8} *3*; α(IPF)=0.000532 *8*

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Adopted Levels, Gammas (continued)

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	α[†]	Comments
7473.49	1+	2938.6[i] 4	80[i] 17	4534.14	2+			
		7473.0[i] 8	100[i] 20	0.0	0+	M1		α(IPF)=0.00193 3 Mult.: from (γ,γ′),(pol γ,γ′).
7495.2		6162.5[i] 6	100.0[i]	1332.514	2+			
7531.4	8+	1418.9 4	75 25	6112.43	7+	M1+E2	0.000158 13	α=0.000158 13; α(K)=9.5×10^{-5} 5; α(L)=9.3×10^{-6} 5; α(M)=1.30×10^{-6} 7; α(N+..)=5.2×10^{-5} 8 α(N)=5.6×10^{-8} 3; α(IPF)=5.2×10^{-5} 8
		3266.9 8	100 25	4265.00	6+	E2	0.000919 13	α=0.000919 13; α(K)=2.22×10^{-5} 4; α(L)=2.15×10^{-6} 3; α(M)=3.02×10^{-7} 5; α(N+..)=0.000894 13 α(N)=1.315×10^{-8} 19; α(IPF)=0.000894 13
7552.0		5393.3[i] 3	100.0[i]	2158.632	2+			
7559.5	1−	7559.0[j] 8	100[j]	0.0	0+	E1[j]		α(IPF)=0.00262 4
7627.4		677		6950.4	(10)			
7647.4	1−	7646.9 7	100	0.0	0+	E1		α(IPF)=0.00264 4
7657.6	1+	7657.1[j] 8	100[j]	0.0	0+	M1[j]		α(IPF)=0.00196 3
7684.1		6351.2[i] 4	100.0[i]	1332.514	2+			
7690.0	1−	3354.5[i] 4	100[i] 11	4335.52	2			
		6358.8[j] 16	2[j] 1	1332.514	2+	[j]		
		7689.5[i] 5	90[i] 13	0.0	0+	E1		α(IPF)=0.00265 4 Mult.: from (γ,γ′),(pol γ,γ′).
7691.4	(9−)	2500[h]		5191.7				
7732.5	8+	2586.2 6	75 25	5148.51	6+	E2	0.000632 9	α=0.000632 9; α(K)=3.25×10^{-5} 5; α(L)=3.15×10^{-6} 5; α(M)=4.44×10^{-7} 7; α(N+..)=0.000595 9 α(N)=1.93×10^{-8} 3; α(IPF)=0.000595 9
		3465.8 8	100 25	4265.00	6+	E2	0.000995 14	α=0.000995 14; α(K)=2.02×10^{-5} 3; α(L)=1.96×10^{-6} 3; α(M)=2.76×10^{-7} 4; α(N+..)=0.000972 14 α(N)=1.199×10^{-8} 17; α(IPF)=0.000972 14
7747.6	1−	5461.9[j] 11	20[j] 4	2284.80	0+	[j]		
		5590.1[j] 10	16.7[j] 19	2158.632	2+	[j]		
		6413.8[j] 9	50[j] 6	1332.514	2+	[j]		
		7747.3[j] 8	100[j] 8	0.0	0+	E1[j]		α(IPF)=0.00266 4
7760.33	8−	294.7 2	20 10	7465.66	(7−)	(M1+E2)	0.006 4	α=0.006 4; α(K)=0.006 4; α(L)=0.0006 4; α(M)=8.E−5 5; α(N+..)=3.4×10^{-6} 18 α(N)=3.4×10^{-6} 18
		948.5 3	20 10	6810.95	9−	M1+E2	0.00025 3	α=0.00025 3; α(K)=0.000223 24; α(L)=2.18×10^{-5} 24; α(M)=3.1×10^{-6} 4; α(N+..)=1.32×10^{-7} 14 α(N)=1.32×10^{-7} 14
		1648.0 4	40 10	6112.43	7+	E1	0.000419 6	α=0.000419 6; α(K)=3.94×10^{-5} 6; α(L)=3.82×10^{-6} 6; α(M)=5.37×10^{-7} 8; α(N+..)=0.000375 6 α(N)=2.33×10^{-8} 4; α(IPF)=0.000375 6
		1860.4 5	10 10	5901.69	6−	E2	0.000310 5	α=0.000310 5; α(K)=5.84×10^{-5} 9; α(L)=5.67×10^{-6} 8; α(M)=7.99×10^{-7}

γ(^{60}Ni) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$‡	I$_\gamma$	E$_f$	J$^\pi_f$	Mult.#	δ@	α†	Comments
									12; α(N+..)=0.000245 *4* α(N)=3.46×10^{-8} *5*; α(IPF)=0.000245 *4*
7760.33	8$^-$	2411.4 *6*	100 *10*	5348.79	7$^-$	M1+E2		0.00051 *4*	α=0.00051 *4*; α(K)=3.60×10^{-5} *9*; α(L)=3.48×10^{-6} *9*; α(M)=4.91×10^{-7} *12*; α(N+..)=0.00047 *4* α(N)=2.13×10^{-8} *5*; α(IPF)=0.00047 *4*
7761.8	1$^+$	1399.4[i] *4*	37[i] *12*	6362.05					
		4492.3[i] *6*	81[i] *15*	3269.19	2$^+$				
		7761.6[i] *8*	100[i] *23*	0.0	0$^+$	M1			α(IPF)=0.00198 *3* Mult.: from (γ,γ′),(pol γ,γ′).
7798.9		1472.6[i] *6*	1.0×10^2[i] *3*	6327.21	2$^+$				
		5640.4[i] *7*	95[i] *24*	2158.632	2$^+$				
7813.5		1141[h]		6672.4	(9)				
7818.02		4693.6[i] *5*	100.0[i]	3123.698	2$^+$				
7850.3	1$^+$	7849.7[j] *10*	100[j]	0.0	0$^+$	M1[j]			α(IPF)=0.00200 *3*
7880.4	1$^+$	7879.8[j] *12*	100[j]	0.0	0$^+$	M1[j]			α(IPF)=0.00200 *3*
7926.7	1$^+$	7926.1[j] *17*	100[j]	0.0	0$^+$	M1[j]			α(IPF)=0.00201 *3*
7950.93	1$^+$	3632.4[i] *6*	89[i] *23*	4318.58	2$^+$				
		4080.0[i] *7*	100[i] *23*	3871.050	2$^+$				
		7951.4[i] *8*	93[i] *23*	0.0	0$^+$	M1			α(IPF)=0.00201 *3* Mult.: from (γ,γ′),(pol γ,γ′).
7980.81	9$^+$	547.2 *4*	7 *7*	7433.45	9$^+$	D			
		1519.9 *4*	100 *36*	6461.10	8$^+$	M1+E2		0.000176 *15*	α=0.000176 *15*; α(K)=8.3×10^{-5} *4*; α(L)=8.1×10^{-6} *4*; α(M)=1.14×10^{-6} *5*; α(N+..)=8.3×10^{-5} *12* α(N)=4.94×10^{-8} *21*; α(IPF)=8.3×10^{-5} *12*
		2317.5 *3*	71 *21*	5663.03	7$^+$	E2		0.000511 *8*	α=0.000511 *8*; α(K)=3.93×10^{-5} *6*; α(L)=3.80×10^{-6} *6*; α(M)=5.36×10^{-7} *8*; α(N+..)=0.000467 *7* α(N)=2.33×10^{-8} *4*; α(IPF)=0.000467 *7*
8042.6	1$^+$	8042.0[j] *16*	100[j]	0.0	0$^+$	M1[j]			
8044.26	9$^-$	283.9 *2*	27 *4*	7760.33	8$^-$	M1+E2		0.007 *4*	α=0.007 *4*; α(K)=0.007 *4*; α(L)=0.0007 *4*; α(M)=9.E−5 *6*; α(N+..)=3.8×10^{-6} *21* α(N)=3.8×10^{-6} *21*
		352.9 *2*	44 *6*	7691.4	(9$^-$)	M1+E2		0.0036 *17*	α=0.0036 *17*; α(K)=0.0032 *15*; α(L)=0.00032 *16*; α(M)=4.5×10^{-5} *22*; α(N+..)=1.9×10^{-6} *9* α(N)=1.9×10^{-6} *9*
		683.3 *2*	2.1 *2*	7360.97	(8)	(D+Q)			
		1207.0 *3*	100 *10*	6837.2	8$^-$	M1+E2	+0.37 *4*	0.0001471 *22*	α=0.0001471 *22*; α(K)=0.0001257 *18*; α(L)=1.223×10^{-5} *18*; α(M)=1.724×10^{-6} *25* α(N)=7.47×10^{-8} *11*; α(IPF)=7.37×10^{-6} *13* B(M1)(W.u.)=0.10 *+11−10*; B(E2)(W.u.)=18 *+19−18*
		1233.0 *3*	23 *4*	6810.95	9$^-$	D			
		1583.3 *4*	13 *2*	6461.10	8$^+$	E1		0.000370 *6*	α=0.000370 *6*; α(K)=4.20×10^{-5} *6*; α(L)=4.07×10^{-6} *6*;

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$\gamma(^{60}\mathrm{Ni})$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	α[†]	Comments
								α(M)=5.73×10^{-7} *8*; α(N+..)=0.000324 *5* α(N)=2.48×10^{-8} *4*; α(IPF)=0.000323 *5* B(E1)(W.u.)=0.00013 *+14−13*
8044.26	9$^-$	2696.1 *6*	60 *4*	5348.79	7$^-$	E2	0.000680 *10*	α=0.000680 *10*; α(K)=3.03×10^{-5} *5*; α(L)=2.94×10^{-6} *5*; α(M)=4.14×10^{-7} *6*; α(N+..)=0.000646 *9* α(N)=1.80×10^{-8} *3*; α(IPF)=0.000646 *9* B(E2)(W.u.)=1.6 *16*
8074.4	8$^+$	3807.8 *9*	100	4265.00	6$^+$	E2	0.001123 *16*	α=0.001123 *16*; α(K)=1.752×10^{-5} *25*; α(L)=1.692×10^{-6} *24*; α(M)=2.38×10^{-7} *4*; α(N+..)=0.001104 α(N)=1.037×10^{-8} *15*; α(IPF)=0.001104 *16*
8086.0	1$^-$	5800.8[j] *8*	16.0[j] *25*	2284.80	0$^+$	[j]		
		6752.3[j] *13*	7.4[j] *25*	1332.514	2$^+$	[j]		
		8085.7[j] *7*	100[j] *25*	0.0	0$^+$	E1[j]		
8111.8	1$^+$	8111.2 *12*	100	0.0	0$^+$	M1		
8126.6	1$^-$	8126.0 *7*	100	0.0	0$^+$	E1		
8189.1	1	8188.5[j] *7*	100[j]	0.0	0$^+$	[j]		
8261.5	1$^-$	8260.9[j] *8*	100[j]	0.0	0$^+$	E1[j]		
8272.09	10$^-$	1435.0 *4*	18 *2*	6837.2	8$^-$	E2	0.0001726 *25*	α=0.0001726 *25*; α(K)=9.73×10^{-5} *14*; α(L)=9.48×10^{-6} *14*; α(M)=1.335×10^{-6} *19*; α(N+..)=6.44×10^{-5} α(N)=5.76×10^{-8} *8*; α(IPF)=6.44×10^{-5} *10*
		1461.6 *4*	100 *15*	6810.95	9$^-$	M1+E2	0.000164 *14*	α=0.000164 *14*; α(K)=9.0×10^{-5} *5*; α(L)=8.7×10^{-6} *5*; α(M)=1.23×10^{-6} *6*; α(N+..)=6.4×10^{-5} *9* α(N)=5.33×10^{-8} *24*; α(IPF)=6.4×10^{-5} *9*
8286.3	(1$^+$)	2613.9[i] *3*	100[i] *16*	5672.36				
		5659.9[i] *8*	58[i] *16*	2626.06	3$^+$			
8294.0	1$^-$	6135.5[j] *11*	54[j] *8*	2158.632	2$^+$	[j]		
		8293.0[j] *10*	100[j] *7*	0.0	0$^+$	E1[j]		
8351.8	1$^+$	8351.2[j] *13*	100[j]	0.0	0$^+$	M1[j]		
8359.3	1$^+$	8358.7[j] *15*	100[j]	0.0	0$^+$	M1[j]		
8389.9	9$^-$	3039.2 *7*	100	5348.79	7$^-$	E2	0.000826 *12*	α=0.000826 *12*; α(K)=2.49×10^{-5} *4*; α(L)=2.41×10^{-6} *4*; α(M)=3.40×10^{-7} *5*; α(N+..)=0.000799 *12* α(N)=1.476×10^{-8} *21*; α(IPF)=0.000799 *12*
8407	1$^-$	8406 *4*	100	0.0	0$^+$	E1		
8426.69	9$^-$	3077.8 *1*	100	5348.79	7$^-$	E2	0.000842 *12*	α=0.000842 *12*; α(K)=2.44×10^{-5} *4*; α(L)=2.36×10^{-6} *4*; α(M)=3.33×10^{-7} *5*; α(N+..)=0.000815 *12* α(N)=1.447×10^{-8} *21*; α(IPF)=0.000815 *12*
8451.5	1	8450.9[j] *16*	100[j]	0.0	0$^+$	[j]		
8464.0	1$^-$	8463.4[j] *13*	100[j]	0.0	0$^+$	E1[j]		
8485.50	9$^-$	1648.2 *4*	86 *14*	6837.2	8$^-$	M1+E2	0.000211 *20*	α=0.000211 *20*; α(K)=7.1×10^{-5} *3*; α(L)=6.9×10^{-6} *3*; α(M)=9.7×10^{-7} *4*; α(N+..)=0.000132 *17* α(N)=4.23×10^{-8} *16*; α(IPF)=0.000132 *17*

$^{60}_{28}\mathrm{Ni}_{32}$-36

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ	E_f	J^π_f	Mult.#	α†	Comments
		1674.5 *4*	29 *14*	6810.95	9^-	M1	0.000200 *3*	α=0.000200 *3*; α(K)=6.68×10^{-5} *10*; α(L)=6.48×10^{-6} *9*; α(M)=9.14×10^{-7}

$^{60}_{28}Ni_{32}$-37

Adopted Levels, Gammas (continued)

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	δ[@]	α[†]	Comments
									13; α(N+..)=0.0001253 *18* α(N)=3.97×10^{-8} *6*; α(IPF)=0.0001253 *18*
8485.50	9^-	3136.9 *7*	100 *14*	5348.79	7^-	E2		0.000866 *13*	α=0.000866 *13*; α(K)=2.37×10^{-5} *4*; α(L)=2.29×10^{-6} *4*; α(M)=3.23×10^{-7} *5*; α(N+..)=0.000839 *12* α(N)=1.403×10^{-8} *20*; α(IPF)=0.000839 *12*
8504.7		4617.2[i] *4*	100[i] *13*	3887.36	2^+				
		8504.2[i] *9*	42[i] *9*	0.0	0^+				
8515.2	1^-	8514.6[j] *9*	100[j]	0.0	0^+	E1[j]			
8521.11	10^-	249.0 *1*	2.3 *6*	8272.09	10^-	M1		0.00449 *7*	α=0.00449 *7*; α(K)=0.00403 *6*; α(L)=0.000401 *6*; α(M)=5.65×10^{-5} *8*; α(N+..)=2.41×10^{-6} *4* α(N)=2.41×10^{-6} *4* B(M1)(W.u.)=0.040 *+20−40*
		476.7 *2*	100 *3*	8044.26	9^-	M1(+E2)		0.0014 *5*	α=0.0014 *5*; α(K)=0.0013 *5*; α(L)=0.00013 *5*; α(M)=1.8×10^{-5} *6*; α(N+..)=7.7×10^{-7} *25* α(N)=7.7×10^{-7} *25*
		1710.1 *4*	60 *4*	6810.95	9^-	M1+E2	+0.34 *5*	0.000214 *4*	α=0.000214 *4*; α(K)=6.48×10^{-5} *10*; α(L)=6.28×10^{-6} *9*; α(M)=8.85×10^{-7} *13*; α(N+..)=0.0001422 *23* α(N)=3.85×10^{-8} *6*; α(IPF)=0.0001422 *23* B(M1)(W.u.)=0.0029 *+12−29*; B(E2)(W.u.)=0.21 *+11−21*
8565.60		4487.56[i] *25*	100[i] *9*	4077.99	$1^+,2^+$				
		4678.3[i] *5*	91[i] *9*	3887.36	2^+				
8638.5		2572.2[i] *4*	61[i] *15*	6066.72					
		5452.1[i] *5*	100[i] *18*	3185.98	(3^+)				
8655.4	1^-	8654.7[j] *9*	100[j]	0.0	0^+	[j]			
8656.8	1^+	7324.2[j] *14*	75[j] *13*	1332.514	2^+	[j]			
		8655.9[j] *9*	100[j] *20*	0.0	0^+	[j]			
8666.21		5046.4[i] *7*	89[i] *17*	3619.46	3^+				
		5472.8[i] *5*	100[i] *14*	3193.87	1^+				
8688.4	1^+	8687.7[j] *13*	100[j]	0.0	0^+	M1[j]			
8688.92	10^+	1255.4 *4*	100 *18*	7433.45	9^+	M1+E2	+0.5 *3*	0.000145 *5*	α=0.000145 *5*; α(K)=0.000118 *4*; α(L)=1.14×10^{-5} *4*; α(M)=1.61×10^{-6} *5*; α(N+..)=1.46×10^{-5} *11* α(N)=6.98×10^{-8} *19*; α(IPF)=1.45×10^{-5} *11*
		1661.9 *4*	35 *6*	7027.83	8^+	E2		0.000235 *4*	α=0.000235 *4*; α(K)=7.25×10^{-5} *11*; α(L)=7.05×10^{-6} *10*; α(M)=9.92×10^{-7} *14*; α(N+..)=0.0001545 *2* α(N)=4.29×10^{-8} *6*; α(IPF)=0.0001544 *22*
		2227.2 *5*	47 *12*	6461.10	8^+	E2		0.000470 *7*	α=0.000470 *7*; α(K)=4.21×10^{-5} *6*; α(L)=4.08×10^{-6} *6*; α(M)=5.75×10^{-7} *8*; α(N+..)=0.000423 *6* α(N)=2.49×10^{-8} *4*; α(IPF)=0.000423 *6*
8747.0	1^-	8746.3[j] *12*	100[j]	0.0	0^+	E1[j]			
8768	1^+	8767 *4*	100	0.0	0^+	M1			
8778.6	1^+	8777.9[j] *10*	100[j]	0.0	0^+	M1[j]			

$^{60}_{28}Ni_{32}$-38

Adopted Levels, Gammas (continued)

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ	E_f	J_f^π	Mult.[#]	δ[@]	α[†]	Comments
8781.6	1^-	8780.9[j] *10*	100[j]	0.0	0^+	E1[j]			
8793.6	1^+	7459.5[j] *11*	100[j] *20*	1332.514	2^+	[j]			
		8795.2[j] *16*	82[j] *19*	0.0	0^+	M1[j]			
8846.5	1^+	8845.8[j] *14*	100[j]	0.0	0^+	M1[j]			
8871.7	1^+	8871.0[j] *16*	100[j]	0.0	0^+	M1[j]			
8890.5	1^+	8889.8[j] *12*	100[j]	0.0	0^+	M1[j]			
8924.1	1^-	8923.4[j] *10*	100[j]	0.0	0^+	E1[j]			
9010.5	1^-	9009.8[j] *19*	100[j]	0.0	0^+	E1[j]			
9045.20		5173.6[i] *3*	100[i]	3871.050	2^+				
9053.3	1^-	9052.6[j] *24*	100[j]	0.0	0^+	E1[j]			
9068.9	1^+	9068.2[j] *13*	100[j]	0.0	0^+	M1[j]			
9076.66		5759.1[i] *7*	100[i] *21*	3317.829	0^+				
		5952.4[i] *5*	100[i] *21*	3123.698	2^+				
9092.3	1^-	7761.2 *19*	25 *8*	1332.514	2^+	E1			α(IPF)=0.00266 *4*
		9091.2 *8*	100 *25*	0.0	0^+	E1			
9123.01	10^-	601.6 *2*	11 *6*	8521.11	10^-	D			
		637.5 *2*	100 *6*	8485.50	9^-	M1+E2		0.00065 *15*	α=0.00065 *15*; α(K)=0.00059 *13*; α(L)=5.8×10^{-5} *13*; α(M)=8.1×10^{-6} *18*; α(N+..)=3.5×10^{-7} *8* α(N)=3.5×10^{-7} *8*
		2311.8 *6*	28 *5*	6810.95	9^-	M1+E2		0.00047 *4*	α=0.00047 *4*; α(K)=3.87×10^{-5} *10*; α(L)=3.75×10^{-6} *10*; α(M)=5.28×10^{-7} *13*; α(N+..)=0.00043 *4* α(N)=2.29×10^{-8} *6*; α(IPF)=0.00043 *4*
9132.2	1^-	9131.5[j] *15*	100[j]	0.0	0^+	E1[j]			
9132.27	11^-	611.5 *2*	100 *3*	8521.11	10^-	M1+E2	+0.08 *7*	0.000561 *10*	α=0.000561 *10*; α(K)=0.000504 *9*; α(L)=4.94×10^{-5} *9*; α(M)=6.96×10^{-6} *12*; α(N+..)=3.00×10^{-7} *5* α(N)=3.00×10^{-7} *5* B(M1)(W.u.)=0.52 *+23−29*; B(E2)(W.u.)=2.E+1 *+3−2*
		1088.2 *3*	2.8 *4*	8044.26	9^-	E2		0.000198 *3*	α=0.000198 *3*; α(K)=0.0001780 *25*; α(L)=1.741×10^{-5} *25*; α(M)=2.45×10^{-6} *4*; α(N+..)=1.054×10^{-7} α(N)=1.054×10^{-7} *15* B(E2)(W.u.)=4.0 *+19−24*
9149	1^-	9148.7[j] *30*	100[j]	0.0	0^+	E1[j]			
9256.0	1^-	9255.2[j] *25*	100[j]	0.0	0^+	E1[j]			
9264.30	11^-	874.1 *3*	9 *9*	8389.9	9^-	E2		0.000337 *5*	α=0.000337 *5*; α(K)=0.000303 *5*; α(L)=2.97×10^{-5} *5*; α(M)=4.18×10^{-6} *6*; α(N+..)=1.79×10^{-7} *3* α(N)=1.79×10^{-7} *3*
		2452.2 *6*	100 *9*	6810.95	9^-	E2		0.000571 *8*	α=0.000571 *8*; α(K)=3.56×10^{-5} *5*; α(L)=3.45×10^{-6} *5*; α(M)=4.86×10^{-7} *7*; α(N+..)=0.000532 *8* α(N)=2.11×10^{-8} *3*; α(IPF)=0.000532 *8*
9266.5	1^-	9265.7[j] *24*	100[j]	0.0	0^+	E1[j]			

From ENSDF

$^{60}_{28}Ni_{32}$-39

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J_i^π	E_γ‡	I_γ	E_f	J_f^π	Mult.#	δ@	α†	Comments
9274.7	1	9273.9[j] 15	100[j]	0.0	0^+	[j]			
9301.2	1^+	9300.4[j] 15	100[j]	0.0	0^+	M1[j]			

$^{60}_{28}Ni_{32}$-40

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	α[†]	Comments
9308.3	1^-	9307.5 *14*	100	0.0	0^+	E1		
9346.82		5306.7[i] *4*	100.0[i]	4039.89	3^-			
9352.6	1^-	9351.8[j] *21*	100[j]	0.0	0^+	E1[j]		
9395.5	1^-	9394.7[j] *15*	100[j]	0.0	0^+	E1[j]		
9410.7	1^-	9409.9[j] *17*	100[j]	0.0	0^+	E1[j]		
9426.2	10^+	1992.9 *5*	100	7433.45	9^+	M1+E2	0.00034 *3*	α=0.00034 *3*; α(K)=5.02×10^{-5} *14*; α(L)=4.87×10^{-6} *14*; α(M)=6.86×10^{-7} *20*; α(N+..)=0.00028 *3* α(N)=2.98×10^{-8} *9*; α(IPF)=0.00028 *3*
9453.1	1^+	9452.3[j] *16*	100[j]	0.0	0^+	M1[j]		
9463.9	1^-	7303.2[j] *16*	1.0×10^2[j] *3*	2158.632	2^+	[j]		
		9464.5[j] *15*	61[j] *20*	0.0	0^+	E1[j]		
9468	1^+	9466.8[j] *35*	100[j]	0.0	0^+	M1[j]		
9504.9	1^-	9504.1[j] *17*	100[j]	0.0	0^+	E1[j]		
9599.0	1^-	9598.2[j] *15*	100[j]	0.0	0^+	E1[j]		
9622.5	10^-	2785.2 *7*	100	6837.2	8^-	E2	0.000718 *10*	α=0.000718 *10*; α(K)=2.87×10^{-5} *4*; α(L)=2.78×10^{-6} *4*; α(M)=3.92×10^{-7} *6*; α(N+..)=0.000686 *10* α(N)=1.703×10^{-8} *24*; α(IPF)=0.000686 *10*
9640.2	1^-	9639.4[j] *21*	100[j]	0.0	0^+	E1[j]		
9659.3	1^-	8326.0 *16*	11 *4*	1332.514	2^+			
		9658.5 *9*	100 *23*	0.0	0^+	E1		
9665.67	10^+	1590.9 *4*	33 *7*	8074.4	8^+	E2	0.000211 *3*	α=0.000211 *3*; α(K)=7.90×10^{-5} *11*; α(L)=7.68×10^{-6} *11*; α(M)=1.082×10^{-6} *16*; α(N+..)=0.0001237 α(N)=4.68×10^{-8} *7*; α(IPF)=0.0001236 *18*
		1934.0 *5*	27 *7*	7732.5	8^+	E2	0.000340 *5*	α=0.000340 *5*; α(K)=5.43×10^{-5} *8*; α(L)=5.27×10^{-6} *8*; α(M)=7.43×10^{-7} *11*; α(N+..)=0.000280 *4* α(N)=3.22×10^{-8} *5*; α(IPF)=0.000280 *4*
		2134.4 *5*	27 *7*	7531.4	8^+	E2	0.000428 *6*	α=0.000428 *6*; α(K)=4.54×10^{-5} *7*; α(L)=4.40×10^{-6} *7*; α(M)=6.20×10^{-7} *9*; α(N+..)=0.000378 *6* α(N)=2.69×10^{-8} *4*; α(IPF)=0.000378 *6*
		2233.0 *5*	20 *7*	7433.45	9^+	M1+E2	0.00044 *4*	α=0.00044 *4*; α(K)=4.11×10^{-5} *11*; α(L)=3.98×10^{-6} *10*; α(M)=5.60×10^{-7} *15*; α(N+..)=0.00039 *4* α(N)=2.43×10^{-8} *6*; α(IPF)=0.00039 *4*
		2284.9 *6*	20 *7*	7380.3	8^+	E2	0.000496 *7*	α=0.000496 *7*; α(K)=4.03×10^{-5} *6*; α(L)=3.90×10^{-6} *6*; α(M)=5.49×10^{-7} *8*; α(N+..)=0.000451 *7* α(N)=2.38×10^{-8} *4*; α(IPF)=0.000451 *7*
		2416.3 *6*	47 *7*	7250.0	8^+	E2	0.000555 *8*	α=0.000555 *8*; α(K)=3.65×10^{-5} *6*; α(L)=3.54×10^{-6} *5*; α(M)=4.98×10^{-7} *7*; α(N+..)=0.000515 *8* α(N)=2.16×10^{-8} *3*; α(IPF)=0.000515 *8*
		2854.4 *7*	100 *13*	6810.95	9^-	E1	0.001180 *17*	α=0.001180 *17*; α(K)=1.777×10^{-5} *25*; α(L)=1.715×10^{-6} *24*; α(M)=2.41×10^{-7} *4*; α(N+..)=0.001160 α(N)=1.049×10^{-8} *15*; α(IPF)=0.001160 *17*
		3204.6 *7*	13 *7*	6461.10	8^+	E2	0.000893 *13*	α=0.000893 *13*; α(K)=2.29×10^{-5} *4*; α(L)=2.21×10^{-6} *4*; α(M)=3.12×10^{-7}

$\gamma(^{60}$Ni) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	α[†]	Comments
								5; α(N+..)=0.000868 *13* α(N)=1.356×10^{-8} *19*; α(IPF)=0.000868 *13*
9701.4	1^-	9700.6[j] *15*	100[j]	0.0	0^+	E1[j]		
9714.9	(10^+)	1287.9 *4*	100	8426.69	9^-	(E1)	0.0001757 *25*	α=0.0001757 *25*; α(K)=5.93×10^{-5} *9*; α(L)=5.75×10^{-6} *8*; α(M)=8.10×10^{-7} *12*; α(N+..)=0.0001098 *1* α(N)=3.50×10^{-8} *5*; α(IPF)=0.0001098 *16*
9718.27	11^-	454.0 *2*	9 *9*	9264.30	11^-	M1	0.001084 *16*	α=0.001084 *16*; α(K)=0.000974 *14*; α(L)=9.59×10^{-5} *14*; α(M)=1.351×10^{-5} *19*; α(N+..)=5.81×10^{-7} α(N)=5.81×10^{-7} *9*
		1196.8 *3*	65 *6*	8521.11	10^-	M1+E2	0.000157 *12*	α=0.000157 *12*; α(K)=0.000135 *10*; α(L)=1.31×10^{-5} *10*; α(M)=1.85×10^{-6} *13*; α(N+..)=7.2×10^{-6} *13* α(N)=8.0×10^{-8} *6*; α(IPF)=7.2×10^{-6} *13*
		1447.1 *4*	41 *6*	8272.09	10^-	M1+E2	0.000162 *14*	α=0.000162 *14*; α(K)=9.2×10^{-5} *5*; α(L)=8.9×10^{-6} *5*; α(M)=1.25×10^{-6} *6*; α(N+..)=6.0×10^{-5} *9* α(N)=5.43×10^{-8} *25*; α(IPF)=6.0×10^{-5} *9*
		2905.9 *7*	100 *6*	6810.95	9^-	E2	0.000770 *11*	α=0.000770 *11*; α(K)=2.68×10^{-5} *4*; α(L)=2.59×10^{-6} *4*; α(M)=3.65×10^{-7} *6*; α(N+..)=0.000740 *11* α(N)=1.588×10^{-8} *23*; α(IPF)=0.000740 *11*
9721.0	1^-	9720.2[j] *18*	100[j]	0.0	0^+	E1[j]		
9751.5	1^-	9750.6[j] *23*	100[j]	0.0	0^+	E1[j]		
9760.42	11^-	1239.0 *3*	44 *5*	8521.11	10^-	M1+E2	0.000152 *11*	α=0.000152 *11*; α(K)=0.000125 *8*; α(L)=1.22×10^{-5} *8*; α(M)=1.72×10^{-6} *12*; α(N+..)=1.33×10^{-5} *23* α(N)=7.4×10^{-8} *5*; α(IPF)=1.33×10^{-5} *22*
		2948.8 *7*	100 *9*	6810.95	9^-	E2	0.000789 *11*	α=0.000789 *11*; α(K)=2.62×10^{-5} *4*; α(L)=2.53×10^{-6} *4*; α(M)=3.57×10^{-7} *5*; α(N+..)=0.000759 *11* α(N)=1.550×10^{-8} *22*; α(IPF)=0.000759 *11*
9774.8	1^-	9773.9[j] *20*	100[j]	0.0	0^+	E1[j]		
9807.5	1^-	9806.6[j] *19*	100[j]	0.0	0^+	E1[j]		
9831	1^+	9830[j] *4*	100[j]	0.0	0^+	M1[j]		
9832.0	1^-	9831.1[j] *21*	100[j]	0.0	0^+	E1[j]		
9871.3	1^-	9870.4[j] *20*	100[j]	0.0	0^+	E1[j]		
9887.9	10^+	2638.4 *6*	100 *50*	7250.0	8^+	E2	0.000655 *10*	α=0.000655 *10*; α(K)=3.15×10^{-5} *5*; α(L)=3.04×10^{-6} *5*; α(M)=4.29×10^{-7} *6*; α(N+..)=0.000620 *9* α(N)=1.86×10^{-8} *3*; α(IPF)=0.000620 *9*
		3079.0 *7*	100 *50*	6810.95	9^-	E1	0.001289 *18*	α=0.001289 *18*; α(K)=1.607×10^{-5} *23*; α(L)=1.550×10^{-6} *22*; α(M)=2.18×10^{-7} *3*; α(N+..)=0.001271 α(N)=9.49×10^{-9} *14*; α(IPF)=0.001271 *18*
9893.5	1^-	9892.6[j] *17*	100[j]	0.0	0^+	E1[j]		
9953.7		5933.3[i] *7*	100[i]	4019.886	1^+			
9960.14	11^-	827.8 *6*	15 *8*	9132.27	11^-	M1	0.000293 *5*	α=0.000293 *5*; α(K)=0.000264 *4*; α(L)=2.57×10^{-5} *4*; α(M)=3.63×10^{-6} *6*; α(N+..)=1.569×10^{-7} *22*

$^{60}_{28}$Ni$_{32}$-42

$\gamma(^{60}\mathrm{Ni})$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ	E_f	J^π_f	Mult.#	α†	Comments
								α(N)=1.569×10^{-7} *22*

γ(^{60}Ni) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	δ[@]	α[†]	Comments
9960.14	11⁻	836.4 *3*	100 *8*	9123.01	10⁻	M1+E2		0.00033 *5*	α=0.00033 *5*; α(K)=0.00030 *4*; α(L)=2.9×10^{-5} *4*; α(M)=4.1×10^{-6} *6*; α(N+..)=1.77×10^{-7} *24* α(N)=1.77×10^{-7} *24*
		1438.6 *4*	38 *8*	8521.11	10⁻	M1+E2		0.000160 *13*	α=0.000160 *13*; α(K)=9.3×10^{-5} *5*; α(L)=9.0×10^{-6} *5*; α(M)=1.27×10^{-6} *7*; α(N+..)=5.7×10^{-5} *9* α(N)=5.5×10^{-8} *3*; α(IPF)=5.7×10^{-5} *9*
9989.27	(12⁻)	856.9 *3*	100 *5*	9132.27	11⁻	M1(+E2)	+0.13 *15*	0.000274 *6*	α=0.000274 *6*; α(K)=0.000247 *6*; α(L)=2.41×10^{-5} *6*; α(M)=3.39×10^{-6} *8*; α(N+..)=1.47×10^{-7} *4* α(N)=1.47×10^{-7} *4* B(M1)(W.u.)=(0.16 *+6−16*); B(E2)(W.u.)=(7 *+16−7*)
		1468.3 *4*	4.2 *8*	8521.11	10⁻	E2		0.000179 *3*	α=0.000179 *3*; α(K)=9.28×10^{-5} *13*; α(L)=9.04×10^{-6} *13*; α(M)=1.273×10^{-6} *18*; α(N+..)=7.55×10^{-5} *11* α(N)=5.50×10^{-8} *8*; α(IPF)=7.55×10^{-5} *11* B(E2)(W.u.)=1.1 *+5−11*
10029.02		5184.9 *5*	100	4843.93	2⁺				
10054.23	(11⁻)	789.4 *3*	33 *33*	9264.30	11⁻	(M1)		0.000324 *5*	α=0.000324 *5*; α(K)=0.000291 *4*; α(L)=2.84×10^{-5} *4*; α(M)=4.01×10^{-6} *6*; α(N+..)=1.733×10^{-7} *25* α(N)=1.733×10^{-7} *25*
		3243.4 *7*	100 *33*	6810.95	9⁻	(E2)		0.000909 *13*	α=0.000909 *13*; α(K)=2.25×10^{-5} *4*; α(L)=2.17×10^{-6} *3*; α(M)=3.06×10^{-7} *5*; α(N+..)=0.000884 *13* α(N)=1.331×10^{-8} *19*; α(IPF)=0.000884 *13*
10158.6	(12⁻)	894.1 *3*	100	9264.30	11⁻	(M1+E2)		0.00028 *4*	α=0.00028 *4*; α(K)=0.00026 *3*; α(L)=2.5×10^{-5} *3*; α(M)=3.5×10^{-6} *5*; α(N+..)=1.51×10^{-7} *18* α(N)=1.51×10^{-7} *18*
10241.7	(11⁻)	3428.9 *8*	100	6810.95	9⁻	(E2)		0.000981 *14*	α=0.000981 *14*; α(K)=2.06×10^{-5} *3*; α(L)=1.99×10^{-6} *3*; α(M)=2.80×10^{-7} *4*; α(N+..)=0.000959 *14* α(N)=1.219×10^{-8} *17*; α(IPF)=0.000959 *14*
10697.3	12⁻	936.7 *3*	100 *25*	9760.42	11⁻	M1+E2		0.00026 *3*	α=0.00026 *3*; α(K)=0.00023 *3*; α(L)=2.2×10^{-5} *3*; α(M)=3.2×10^{-6} *4*; α(N+..)=1.36×10^{-7} *15* α(N)=1.36×10^{-7} *15*
		979.1 *3*	75 *25*	9718.27	11⁻	M1+E2		0.000231 *24*	α=0.000231 *24*; α(K)=0.000208 *21*; α(L)=2.03×10^{-5} *21*; α(M)=2.9×10^{-6} *3*; α(N+..)=1.23×10^{-7} *12* α(N)=1.23×10^{-7} *12*
10788.66	12⁻	734.1 *2*	40 *20*	10054.23	(11⁻)	M1+E2		0.00046 *8*	α=0.00046 *8*; α(K)=0.00041 *7*; α(L)=4.0×10^{-5} *7*; α(M)=5.7×10^{-6} *10*; α(N+..)=2.4×10^{-7} *4* α(N)=2.4×10^{-7} *4*
		828.5 *3*	100 *20*	9960.14	11⁻	M1+E2		0.00034 *5*	α=0.00034 *5*; α(K)=0.00031 *5*; α(L)=3.0×10^{-5} *5*; α(M)=4.2×10^{-6} *6*; α(N+..)=1.81×10^{-7} *25* α(N)=1.81×10^{-7} *25*
		1028.0 *9*	80 *20*	9760.42	11⁻	M1+E2		0.000207 *19*	α=0.000207 *19*; α(K)=0.000186 *17*; α(L)=1.82×10^{-5} *18*; α(M)=2.57×10^{-6} *24*; α(N+..)=1.11×10^{-7} *1* α(N)=1.11×10^{-7} *10*

$\gamma(^{60}$Ni) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	α[†]	Comments
10788.66	12^-	1657.5 *4*	60 *20*	9132.27	11^-	M1+E2	0.000214 *20*	α=0.000214 *20*; α(K)=7.0×10^{-5} *3*; α(L)=6.8×10^{-6} *3*; α(M)=9.6×10^{-7} *4*; α(N+..)=0.000136 *17* α(N)=4.18×10^{-8} *15*; α(IPF)=0.000136 *17*
10825.23	11^+	1398.8 *9*	33 *33*	9426.2	10^+	M1+E2	0.000156 *13*	α=0.000156 *13*; α(K)=9.8×10^{-5} *5*; α(L)=9.5×10^{-6} *5*; α(M)=1.34×10^{-6} *7*; α(N+..)=4.7×10^{-5} *7* α(N)=5.8×10^{-8} *3*; α(IPF)=4.7×10^{-5} *7*
		2135.8 *5*	100 *33*	8688.92	10^+	M1+E2	0.00040 *4*	α=0.00040 *4*; α(K)=4.44×10^{-5} *12*; α(L)=4.30×10^{-6} *12*; α(M)=6.06×10^{-7} *16*; α(N+..)=0.00035 *4* α(N)=2.63×10^{-8} *7*; α(IPF)=0.00035 *4*
		2844.8 *7*	100 *33*	7980.81	9^+	E2	0.000744 *11*	α=0.000744 *11*; α(K)=2.78×10^{-5} *4*; α(L)=2.69×10^{-6} *4*; α(M)=3.78×10^{-7} *6*; α(N+..)=0.000713 *10* α(N)=1.644×10^{-8} *23*; α(IPF)=0.000713 *10*
		3390.8 *8*	33 *33*	7433.45	9^+	E2	0.000968 *14*	α=0.000968 *14*; α(K)=2.10×10^{-5} *3*; α(L)=2.02×10^{-6} *3*; α(M)=2.85×10^{-7} *4*; α(N+..)=0.000944 *14* α(N)=1.241×10^{-8} *18*; α(IPF)=0.000944 *14*
10872.60	11^+	1446.6 *4*	33 *33*	9426.2	10^+	M1+E2	0.000162 *14*	α=0.000162 *14*; α(K)=9.2×10^{-5} *5*; α(L)=8.9×10^{-6} *5*; α(M)=1.26×10^{-6} *6*; α(N+..)=6.0×10^{-5} *9* α(N)=5.44×10^{-8} *25*; α(IPF)=6.0×10^{-5} *9*
		2184.4 *5*	67 *33*	8688.92	10^+	M1+E2	0.00042 *4*	α=0.00042 *4*; α(K)=4.27×10^{-5} *11*; α(L)=4.13×10^{-6} *11*; α(M)=5.82×10^{-7} *15*; α(N+..)=0.00037 *4* α(N)=2.53×10^{-8} *7*; α(IPF)=0.00037 *4*
		2891.7 *7*	67 *33*	7980.81	9^+	E2	0.000764 *11*	α=0.000764 *11*; α(K)=2.70×10^{-5} *4*; α(L)=2.61×10^{-6} *4*; α(M)=3.68×10^{-7} *6*; α(N+..)=0.000734 *11* α(N)=1.601×10^{-8} *23*; α(IPF)=0.000734 *11*
		3439.2 *8*	100 *33*	7433.45	9^+	E2	0.000985 *14*	α=0.000985 *14*; α(K)=2.05×10^{-5} *3*; α(L)=1.98×10^{-6} *3*; α(M)=2.79×10^{-7} *4*; α(N+..)=0.000962 *14* α(N)=1.213×10^{-8} *17*; α(IPF)=0.000962 *14*
10977.68	11^+	2289.1 *6*	<17	8688.92	10^+	M1+E2	0.00046 *4*	α=0.00046 *4*; α(K)=3.93×10^{-5} *10*; α(L)=3.81×10^{-6} *10*; α(M)=5.37×10^{-7} *14*; α(N+..)=0.00042 *4* α(N)=2.33×10^{-8} *6*; α(IPF)=0.00042 *4*
		2705.8 *6*	17 *17*	8272.09	10^-	E1	0.001102 *16*	α=0.001102 *16*; α(K)=1.91×10^{-5} *3*; α(L)=1.84×10^{-6} *3*; α(M)=2.60×10^{-7} *4*; α(N+..)=0.001081 *16* α(N)=1.128×10^{-8} *16*; α(IPF)=0.001081 *16*
		2996.6 *7*	100 *50*	7980.81	9^+	E2	0.000809 *12*	α=0.000809 *12*; α(K)=2.55×10^{-5} *4*; α(L)=2.47×10^{-6} *4*; α(M)=3.47×10^{-7} *5*; α(N+..)=0.000780 *11* α(N)=1.511×10^{-8} *22*; α(IPF)=0.000780 *11*
		3544.2 *8*	83 *17*	7433.45	9^+	E2	0.001022 *15*	α=0.001022 *15*; α(K)=1.96×10^{-5} *3*; α(L)=1.89×10^{-6} *3*; α(M)=2.66×10^{-7} *4*; α(N+..)=0.001000 *14* α(N)=1.158×10^{-8} *17*; α(IPF)=0.001000 *14*
11030.60	11^+	2341.7 *6*	100 *50*	8688.92	10^+	M1+E2	0.00048 *4*	α=0.00048 *4*; α(K)=3.78×10^{-5} *9*; α(L)=3.66×10^{-6} *9*; α(M)=5.16×10^{-7} *13*; α(N+..)=0.00044 *4* α(N)=2.24×10^{-8} *6*; α(IPF)=0.00044 *4*

$^{60}_{28}$Ni$_{32}$-45

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ ‡	I_γ	E_f	J^π_f	Mult.#	δ@	α†	Comments
11030.60	11^+	3048.4 *7*	50 *50*	7980.81	9^+	E2		0.000830 *12*	α=0.000830 *12*; α(K)=2.48×10^{-5} *4*; α(L)=2.40×10^{-6} *4*; α(M)=3.38×10^{-7} *5*; α(N+..)=0.000802 *12* α(N)=1.469×10^{-8} *21*; α(IPF)=0.000802 *12*
		3596.7 *8*	50 *50*	7433.45	9^+	E2		0.001041 *15*	α=0.001041 *15*; α(K)=1.91×10^{-5} *3*; α(L)=1.85×10^{-6} *3*; α(M)=2.60×10^{-7} *4*; α(N+..)=0.001020 *15* α(N)=1.132×10^{-8} *16*; α(IPF)=0.001020 *15*
11044.14	12^+	1156.8 *3*	12 *2*	9887.9	10^+	E2		0.0001760 *25*	α=0.0001760 *25*; α(K)=0.0001548 *22*; α(L)=1.513×10^{-5} *22*; α(M)=2.13×10^{-6} *3* α(N)=9.17×10^{-8} *13*; α(IPF)=3.83×10^{-6} *6*
		1283.0 *4*	3 *2*	9760.42	11^-	E1		0.0001728 *25*	α=0.0001728 *25*; α(K)=5.97×10^{-5} *9*; α(L)=5.79×10^{-6} *9*; α(M)=8.15×10^{-7} *12*; α(N+..)=0.0001065 *1* α(N)=3.53×10^{-8} *5*; α(IPF)=0.0001064 *16*
		1329.0 *4*	1.5 *15*	9714.9	(10^+)	(E2)		0.0001623 *23*	α=0.0001623 *23*; α(K)=0.0001143 *16*; α(L)=1.114×10^{-5} *16*; α(M)=1.569×10^{-6} *22* α(N)=6.77×10^{-8} *10*; α(IPF)=3.53×10^{-5} *5*
		1378.7 *4*	100 *3*	9665.67	10^+	E2		0.0001655 *24*	α=0.0001655 *24*; α(K)=0.0001058 *15*; α(L)=1.030×10^{-5} *15*; α(M)=1.451×10^{-6} *21* α(N)=6.26×10^{-8} *9*; α(IPF)=4.79×10^{-5} *7*
		1911.4 *5*	3 *1*	9132.27	11^-	E1		0.000607 *9*	α=0.000607 *9*; α(K)=3.14×10^{-5} *5*; α(L)=3.03×10^{-6} *5*; α(M)=4.27×10^{-7} *6*; α(N+..)=0.000572 *8* α(N)=1.85×10^{-8} *3*; α(IPF)=0.000572 *8*
11079.1	(12^-)	837.1 *3*	100 *50*	10241.7	(11^-)	(M1+E2)		0.00033 *5*	α=0.00033 *5*; α(K)=0.00030 *4*; α(L)=2.9×10^{-5} *4*; α(M)=4.1×10^{-6} *6*; α(N+..)=1.77×10^{-7} *24* α(N)=1.77×10^{-7} *24*
		1025.1 *3*	100 *50*	10054.23	(11^-)	(M1+E2)		0.000209 *20*	α=0.000209 *20*; α(K)=0.000188 *18*; α(L)=1.83×10^{-5} *18*; α(M)=2.58×10^{-6} *25*; α(N+..)=1.11×10^{-7} *1* α(N)=1.11×10^{-7} *10*
11112.8	13^-	954.1 *3*	1.7 *17*	10158.6	(12^-)	(M1+E2)		0.00024 *3*	α=0.00024 *3*; α(K)=0.000220 *24*; α(L)=2.15×10^{-5} *24*; α(M)=3.0×10^{-6} *4*; α(N+..)=1.31×10^{-7} *14* α(N)=1.31×10^{-7} *14*
		1123.4 *3*	100 *7*	9989.27	(12^-)	M1+E2	+0.13 *7*	0.0001597 *24*	α=0.0001597 *24*; α(K)=0.0001426 *21*; α(L)=1.388×10^{-5} *21*; α(M)=1.96×10^{-6} *3* α(N)=8.48×10^{-8} *13*; α(IPF)=1.168×10^{-6} *23*
		1981.1 *5*	7 *2*	9132.27	11^-	E2		0.000360 *5*	α=0.000360 *5*; α(K)=5.20×10^{-5} *8*; α(L)=5.04×10^{-6} *7*; α(M)=7.10×10^{-7} *10*; α(N+..)=0.000303 *5* α(N)=3.08×10^{-8} *5*; α(IPF)=0.000303 *5*
11120.6	12^-	1498.1 *4*	100	9622.5	10^-	E2		0.000185 *3*	α=0.000185 *3*; α(K)=8.91×10^{-5} *13*; α(L)=8.67×10^{-6} *13*; α(M)=1.222×10^{-6} *18*; α(N+..)=8.63×10^{-5} *13* α(N)=5.28×10^{-8} *8*; α(IPF)=8.62×10^{-5} *13*
11224.9	(11^+)	2705 *2*	50 *50*	8521.11	10^-	(E1)		0.001102 *16*	α=0.001102 *16*; α(K)=1.91×10^{-5} *3*; α(L)=1.84×10^{-6} *3*; α(M)=2.60×10^{-7} *4*; α(N+..)=0.001080 *16* α(N)=1.128×10^{-8} *16*; α(IPF)=0.001080 *16*

$^{60}_{28}Ni_{32}$-46

Adopted Levels, Gammas (continued)

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ	E_f	J^π_f	Mult.[#]	δ[@]	α[†]	Comments
11224.9	(11^+)	3792.5 *9*	100 *50*	7433.45	9^+	(E2)		0.001118 *16*	α=0.001118 *16*; α(K)=1.763×10^{-5} *25*; α(L)=1.702×10^{-6} *24*; α(M)=2.40×10^{-7} *4*; α(N+..)=0.001098 α(N)=1.044×10^{-8} *15*; α(IPF)=0.001098 *16*
11255.23	12^+	224.6 *1*	14 *5*	11030.60	11^+	M1+E2	−0.12 *10*	0.0061 *7*	α=0.0061 *7*; α(K)=0.0055 *6*; α(L)=0.00055 *7*; α(M)=7.7×10^{-5} *9*; α(N+..)=3.3×10^{-6} *4* α(N)=3.3×10^{-6} *4*
		278.0 *2*	100 *5*	10977.68	11^+	M1(+E2)	−0.03 *5*	0.00344 *7*	α=0.00344 *7*; α(K)=0.00309 *7*; α(L)=0.000307 *7*; α(M)=4.32×10^{-5} *9*; α(N+..)=1.85×10^{-6} *4* α(N)=1.85×10^{-6} *4*
		382.8 *2*	33 *5*	10872.60	11^+	M1+E2	−0.05 *4*	0.00161 *3*	α=0.00161 *3*; α(K)=0.001447 *24*; α(L)=0.0001430 *24*; α(M)=2.01×10^{-5} *4*; α(N+..)=8.64×10^{-7} *14* α(N)=8.64×10^{-7} *14*
		429.9 *2*	43 *5*	10825.23	11^+	M1(+E2)	−0.04 *4*	0.001230 *19*	α=0.001230 *19*; α(K)=0.001105 *17*; α(L)=0.0001089 *17*; α(M)=1.535×10^{-5} *24* α(N)=6.59×10^{-7} *10*
		1293.4 *4*	29 *5*	9960.14	11^-	E1		0.000179 *3*	α=0.000179 *3*; α(K)=5.89×10^{-5} *9*; α(L)=5.71×10^{-6} *8*; α(M)=8.04×10^{-7} *12*; α(N+..)=0.0001135 *17* α(N)=3.48×10^{-8} *5*; α(IPF)=0.0001135 *17*
		1590.3 *4*	33 *5*	9665.67	10^+	E2		0.000211 *3*	α=0.000211 *3*; α(K)=7.91×10^{-5} *11*; α(L)=7.69×10^{-6} *11*; α(M)=1.083×10^{-6} *16*; α(N+..)=0.0001234 α(N)=4.68×10^{-8} *7*; α(IPF)=0.0001234 *18*
		2123.4 *5*	4.8 *5*	9132.27	11^-	E1		0.000751 *11*	α=0.000751 *11*; α(K)=2.68×10^{-5} *4*; α(L)=2.59×10^{-6} *4*; α(M)=3.65×10^{-7} *6*; α(N+..)=0.000722 *11* α(N)=1.586×10^{-8} *23*; α(IPF)=0.000722 *11*
(11387.700)	$(1^-,2^-)$	1358.67 *18*	0.126 *19*	10029.02					
		1434.0 *3*	0.084 *19*	9953.7					
		2040.85 *19*	0.223 *23*	9346.82					
		2311.00 *18*	0.223 *23*	9076.66					
		2341.9 *4*	0.107 *19*	9045.20					
		2721.59 *25*	0.177 *23*	8666.21					
		2749.5 *4*	0.121 *23*	8638.5					
		2822.3 *3*	0.186 *23*	8565.60					
		2883.0 *4*	0.172 *23*	8504.7					
		3101.2 *6*	0.070 *19*	8286.3	(1^+)				
		3436.9 *3*	0.35 *3*	7950.93	1^+				
		3569.53 *13*	0.409 *23*	7818.02					
		3589.0 *3*	0.24 *4*	7798.9					
		3625.6 *4*	0.16 *3*	7761.8	1^+				
		3697.7 *6*	0.15 *3*	7690.0	1^-				
		3703.4 *8*	0.18 *5*	7684.1					
		3836.1 *5*	0.15 *3*	7552.0					
		3892.4 *5*	0.20 *3*	7495.2					

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[‡]	I_{γ}	E_f	J^{π}_f
(11387.700)	$(1^-,2^-)$	3913.7 *3*	0.19 *3*	7473.49	1^+
		3973.4 *5*	0.19 *3*	7414.16	
		4048.2 *4*	0.22 *3*	7339.68	
		4071.49 *22*	0.34 *4*	7316.13	
		4164.75 *11*	0.90 *4*	7222.80	
		4180.5 *7*	0.084 *18*	7207.6	
		4331.24 *15*	0.53 *3*	7056.27	
		4390.4 *3*	0.19 *2*	6996.86	
		4475.58 *10*	0.70 *3*	6911.93	1^+
		4553.0 *3*	0.33 *3*	6834.92	
		4631.2 *5*	0.17 *3*	6756.4	
		4740.48 *12*	1.05 *5*	6647.17	
		4819.9 *6*	0.15 *3*	6567.33	
		4871.7 *8*	0.11 *3*	6516.72	
		4898.4 *4*	0.30 *3*	6489.28	
		4922.34 *25*	0.72 *5*	6465.25	1^-
		5005.5 *7*	0.14 *3*	6382.4	1
		5025.43 *25*	0.43 *4*	6362.05	
		5059.8 *6*	0.19 *3*	6327.21	2^+
		5148.1 *3*	0.29 *2*	6239.2	
		5320.69 *18*	0.44 *3*	6066.72	
		5419.5 *6*	0.12 *2*	5967.8	
		5468.5 *6*	0.13 *2*	5918.54	
		5485.02 *8*	1.75 *4*	5902.44	
		5509.46 *11*	1.04 *4*	5878.05	
		5527.4 *5*	0.16 *2*	5859.9	
		5676.64 *4*	4.35 *8*	5710.79	
		5714.96 *18*	0.74 *4*	5672.36	
		5775.08 *6*	3.32 *7*	5612.40	
		5911.3 *8*	0.074 *23*	5476.04	
		5940.5 *3*	0.34 *3*	5446.98	2^+
		6099.4 *3*	0.29 *3*	5288.55	
		6260.19 *20*	0.33 *3*	5127.16	
		6322.29 *11*	2.59 *7*	5065.02	(1^-)
		6434.01 *10*	1.04 *3*	4953.36	
		6458.42 *18*	0.46 *3*	4928.98	
		6543.44 *18*	2.7 *1*	4843.93	2^+
		6608.29 *15*	1.36 *6*	4779.13	
		6627.12 *19*	0.59 *4*	4760.23	1,2
		6809.91 *9*	1.55 *6*	4577.45	2^+
		6839.38 *12*	5.6 *3*	4547.96	$1^+,2^+$
		6894.23 *11*	1.28 *5*	4493.16	2^+
		7051.67 *12*	1.02 *4*	4335.52	2
		7068.67 *8*	1.93 *6*	4318.58	2^+

$^{60}_{28}Ni_{32}$-48

Adopted Levels, Gammas (continued)

$\gamma(^{60}\mathrm{Ni})$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ	E_f	J^π_f	Mult.#	δ@	α†	Comments
(11387.700)	$(1^-,2^-)$	7275.9 *9*	0.09 *2*	4111.96	2^+				
		7309.22 *14*	0.99 *5*	4077.99	$1^+,2^+$				
		7367.31 *5*	9.1 *2*	4019.886	1^+				
		7380.77 *4*	11.3 *3*	4006.444	2^+				
		7499.4 *4*	0.35 *3*	3887.36	2^+				
		7516.17 *4*	9.5 *2*	3871.050	2^+				
		7652.88 *8*	2.00 *5*	3734.44	2^+				
		7799.40 *6*	3.20 *7*	3587.72	0^+				
		7993.95 *10*	1.44 *5*	3393.14	2^+				
		8069.26 *4*	14.8 *3*	3317.829	0^+				
		8117.6 *9*	0.20 *6*	3269.19	2^+				
		8193.24 *4*	8.8 *2*	3193.87	1^+				
		8200.88 *17*	0.96 *4*	3185.98	(3^+)				
		8263.35 *5*	7.4 *2*	3123.698	2^+				
		9102.10 *4*	41.1 *7*	2284.80	0^+				
		9228.19 *9*	5.3 *2*	2158.632	2^+				
		10054.14 *7*	38.2 *7*	1332.514	2^+				
		11386.50 *9*	100 *4*	0.0	0^+				
11443.40	13^-	654.9 *2*	29 *7*	10788.66	12^-	M1+E2		0.00061 *13*	α=0.00061 *13*; α(K)=0.00055 *12*; α(L)=5.4×10^{-5} *12*; α(M)=7.6×10^{-6} *16*; α(N+..)=3.2×10^{-7} *7* α(N)=3.2×10^{-7} *7*
		1683.2 *4*	100 *7*	9760.42	11^-	E2		0.000242 *4*	α=0.000242 *4*; α(K)=7.07×10^{-5} *10*; α(L)=6.87×10^{-6} *10*; α(M)=9.68×10^{-7} *14*; α(N+..)=0.0001639 *2* α(N)=4.19×10^{-8} *6*; α(IPF)=0.0001638 *23*
		1724.9 *4*	79 *7*	9718.27	11^-	E2		0.000257 *4*	α=0.000257 *4*; α(K)=6.74×10^{-5} *10*; α(L)=6.55×10^{-6} *10*; α(M)=9.23×10^{-7} *13*; α(N+..)=0.000182 *3* α(N)=4.00×10^{-8} *6*; α(IPF)=0.000182 *3*
11493.6	(12^+)	2361.4 *9*	100	9132.27	11^-	(E1)		0.000901 *13*	α=0.000901 *13*; α(K)=2.31×10^{-5} *4*; α(L)=2.23×10^{-6} *4*; α(M)=3.14×10^{-7} *5*; α(N+..)=0.000876 *13* α(N)=1.362×10^{-8} *19*; α(IPF)=0.000876 *13*
11553.3	13^-	764.2 *3*	100	10788.66	12^-	M1+E2		0.00041 *7*	α=0.00041 *7*; α(K)=0.00037 *6*; α(L)=3.6×10^{-5} *6*; α(M)=5.1×10^{-6} *9*; α(N+..)=2.2×10^{-7} *4* α(N)=2.2×10^{-7} *4*
11785.6	(12^+)	560.8 *2*	50 *25*	11224.9	(11^+)	M1+E2		0.00092 *25*	α=0.00092 *25*; α(K)=0.00082 *22*; α(L)=8.1×10^{-5} *22*; α(M)=1.1×10^{-5} *3*; α(N+..)=4.9×10^{-7} *13* α(N)=4.9×10^{-7} *13*
		2654.2 *6*	100 *25*	9132.27	11^-	(E1)		0.001073 *15*	α=0.001073 *15*; α(K)=1.96×10^{-5} *3*; α(L)=1.89×10^{-6} *3*; α(M)=2.66×10^{-7} *4*; α(N+..)=0.001051 *15* α(N)=1.158×10^{-8} *17*; α(IPF)=0.001051 *15*
11851.17	13^+	596.0 *2*	100 *5*	11255.23	12^+	M1(+E2)	−0.03 *4*	0.000591 *9*	α=0.000591 *9*; α(K)=0.000531 *8*; α(L)=5.21×10^{-5} *8*; α(M)=7.34×10^{-6} *11*; α(N+..)=3.17×10^{-7} *5* α(N)=3.17×10^{-7} *5*

$^{60}_{28}\mathrm{Ni}_{32}$-49

$^{60}_{28}Ni_{32}$-50

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ ‡	I_γ	E_f	J^π_f	Mult.#	δ@	α†	Comments
11851.17	13^+	872.6 *3*	4.5 *15*	10977.68	11^+	E2		0.000338 *5*	α=0.000338 *5*; α(K)=0.000304 *5*; α(L)=2.99×10^{-5} *5*; α(M)=4.20×10^{-6} *6*; α(N+..)=1.80×10^{-7} *3* α(N)=1.80×10^{-7} *3*
		1862.9 *5*	4.5 *15*	9989.27	(12^-)	E1		0.000573 *8*	α=0.000573 *8*; α(K)=3.26×10^{-5} *5*; α(L)=3.15×10^{-6} *5*; α(M)=4.44×10^{-7} *7*; α(N+..)=0.000537 *8* α(N)=1.93×10^{-8} *3*; α(IPF)=0.000536 *8*
11878.0	(13)	1180.7 *3*	100	10697.3	12^-	(D+Q)			
12273.7	14^-	1160.8 *3*	100 *12*	11112.8	13^-	M1+E2	+0.11 *6*	0.0001515 *22*	α=0.0001515 *22*; α(K)=0.0001336 *19*; α(L)=1.300×10^{-5} *19*; α(M)=1.83×10^{-6} *3* α(N)=7.95×10^{-8} *12*; α(IPF)=2.94×10^{-6} *5*
		2284.6 *6*	15 *4*	9989.27	(12^-)	E2		0.000496 *7*	α=0.000496 *7*; α(K)=4.03×10^{-5} *6*; α(L)=3.90×10^{-6} *6*; α(M)=5.50×10^{-7} *8*; α(N+..)=0.000451 *7* α(N)=2.39×10^{-8} *4*; α(IPF)=0.000451 *7*
12486.2	(13^+)	700.8 *2*	100 *25*	11785.6	(12^+)	M1+E2		0.00051 *10*	α=0.00051 *10*; α(K)=0.00046 *9*; α(L)=4.5×10^{-5} *9*; α(M)=6.4×10^{-6} *12*; α(N+..)=2.7×10^{-7} *5* α(N)=2.7×10^{-7} *5*
		2495.3 *6*	75 *25*	9989.27	(12^-)	(E1)		0.000981 *14*	α=0.000981 *14*; α(K)=2.13×10^{-5} *3*; α(L)=2.06×10^{-6} *3*; α(M)=2.90×10^{-7} *4*; α(N+..)=0.000958 *14* α(N)=1.261×10^{-8} *18*; α(IPF)=0.000958 *14*
12578.4	14^+	727.1 *2*	100 *6*	11851.17	13^+	M1(+E2)	+0.03 *5*	0.000385 *6*	α=0.000385 *6*; α(K)=0.000346 *5*; α(L)=3.38×10^{-5} *5*; α(M)=4.77×10^{-6} *7*; α(N+..)=2.06×10^{-7} *3* α(N)=2.06×10^{-7} *3*
		1025.1 *3*	4 *2*	11553.3	13^-	E1		9.99×10^{-5} *14*	α=9.99×10^{-5} *14*; α(K)=8.99×10^{-5} *13*; α(L)=8.73×10^{-6} *13*; α(M)=1.229×10^{-6} *18*; α(N+..)=5.31×10^{-8} *8* α(N)=5.31×10^{-8} *8*
		1323.9 *4*	6 *2*	11255.23	12^+	E2		0.0001621 *23*	α=0.0001621 *23*; α(K)=0.0001152 *17*; α(L)=1.123×10^{-5} *16*; α(M)=1.582×10^{-6} *23* α(N)=6.82×10^{-8} *10*; α(IPF)=3.40×10^{-5} *5*
12742.1	13^+	1956.0 *12*	100 *50*	10788.66	12^-	E1		0.000638 *9*	α=0.000638 *9*; α(K)=3.03×10^{-5} *5*; α(L)=2.93×10^{-6} *5*; α(M)=4.12×10^{-7} *6*; α(N+..)=0.000604 *9* α(N)=1.79×10^{-8} *3*; α(IPF)=0.000604 *9*
		2753.2 *7*	50 *50*	9989.27	(12^-)	E1		0.001128 *16*	α=0.001128 *16*; α(K)=1.87×10^{-5} *3*; α(L)=1.80×10^{-6} *3*; α(M)=2.54×10^{-7} *4*; α(N+..)=0.001107 *16* α(N)=1.102×10^{-8} *16*; α(IPF)=0.001107 *16*
12774.7	14^+	1281.1 *4*	1 *1*	11493.6	(12^+)	(E2)		0.0001616 *23*	α=0.0001616 *23*; α(K)=0.0001236 *18*; α(L)=1.206×10^{-5} *17*; α(M)=1.698×10^{-6} *24* α(N)=7.32×10^{-8} *11*; α(IPF)=2.41×10^{-5} *4*
		1730.4 *4*	100 *5*	11044.14	12^+	E2		0.000259 *4*	α=0.000259 *4*; α(K)=6.70×10^{-5} *10*; α(L)=6.51×10^{-6} *10*; α(M)=9.17×10^{-7} *13*; α(N+..)=0.000185 *3* α(N)=3.97×10^{-8} *6*; α(IPF)=0.000185 *3*

$^{60}_{28}Ni_{32}$-50

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ	E_f	J^π_f	Mult.#	α†	Comments
13037.5	14^-	1916.9 *5*	100	11120.6	12^-	E2	0.000333 *5*	α=0.000333 *5*; α(K)=5.52×10^{-5} *8*; α(L)=5.36×10^{-6} *8*; α(M)=7.55×10^{-7} *11*; α(N+..)=0.000272 *4* α(N)=3.27×10^{-8} *5*; α(IPF)=0.000272 *4*
13246.3	13^+	2202.3 *5*	100 *50*	11044.14	12^+	M1+E2	0.00042 *4*	α=0.00042 *4*; α(K)=4.21×10^{-5} *11*; α(L)=4.08×10^{-6} *11*; α(M)=5.74×10^{-7} *15*; α(N+..)=0.00038 *4* α(N)=2.49×10^{-8} *7*; α(IPF)=0.00038 *4*
		2456.4 *6*	100 *50*	10788.66	12^-	E1	0.000958 *14*	α=0.000958 *14*; α(K)=2.18×10^{-5} *3*; α(L)=2.11×10^{-6} *3*; α(M)=2.97×10^{-7} *5*; α(N+..)=0.000934 *13* α(N)=1.288×10^{-8} *18*; α(IPF)=0.000934 *13*
13282.3	(14^+)	1839.1 *5*	100 *20*	11443.40	13^-	(E1)	0.000556 *8*	α=0.000556 *8*; α(K)=3.32×10^{-5} *5*; α(L)=3.22×10^{-6} *5*; α(M)=4.53×10^{-7} *7*; α(N+..)=0.000519 *8* α(N)=1.96×10^{-8} *3*; α(IPF)=0.000519 *8*
		2238.1 *9*	40 *20*	11044.14	12^+	(E2)	0.000475 *7*	α=0.000475 *7*; α(K)=4.17×10^{-5} *6*; α(L)=4.05×10^{-6} *6*; α(M)=5.70×10^{-7} *8*; α(N+..)=0.000428 *6* α(N)=2.47×10^{-8} *4*; α(IPF)=0.000428 *6*
13353.0	(14^+)	866.8 *3*	100	12486.2	(13^+)	M1+E2	0.00031 *4*	α=0.00031 *4*; α(K)=0.00027 *4*; α(L)=2.7×10^{-5} *4*; α(M)=3.8×10^{-6} *5*; α(N+..)=1.63×10^{-7} *21* α(N)=1.63×10^{-7} *21*
13615.4	15^-	2061.2 *5*	13 *7*	11553.3	13^-	E2	0.000395 *6*	α=0.000395 *6*; α(K)=4.84×10^{-5} *7*; α(L)=4.69×10^{-6} *7*; α(M)=6.61×10^{-7} *10*; α(N+..)=0.000342 *5* α(N)=2.87×10^{-8} *4*; α(IPF)=0.000342 *5*
		2172.9 *5*	100 *7*	11443.40	13^-	E2	0.000445 *7*	α=0.000445 *7*; α(K)=4.40×10^{-5} *7*; α(L)=4.26×10^{-6} *6*; α(M)=6.01×10^{-7} *9*; α(N+..)=0.000397 *6* α(N)=2.61×10^{-8} *4*; α(IPF)=0.000397 *6*
13662.2	15^+	1083.9 *3*	100 *8*	12578.4	14^+	M1+E2	0.000185 *16*	α=0.000185 *16*; α(K)=0.000166 *14*; α(L)=1.62×10^{-5} *14*; α(M)=2.28×10^{-6} *20*; α(N+..)=9.9×10^{-8} *8* α(N)=9.9×10^{-8} *8*
		1811.0 *5*	11 *3*	11851.17	13^+	E2	0.000290 *4*	α=0.000290 *4*; α(K)=6.15×10^{-5} *9*; α(L)=5.97×10^{-6} *9*; α(M)=8.41×10^{-7} *12*; α(N+..)=0.000222 *4* α(N)=3.64×10^{-8} *6*; α(IPF)=0.000222 *4*
13810.0	(15^-)	1536.2 *4*	100 *33*	12333	8^-	(M1+E2)	0.000180 *16*	α=0.000180 *16*; α(K)=8.1×10^{-5} *4*; α(L)=7.9×10^{-6} *4*; α(M)=1.12×10^{-6} *5*; α(N+..)=8.9×10^{-5} *12* α(N)=4.83×10^{-8} *20*; α(IPF)=8.9×10^{-5} *12*
		2697.2 *6*	67 *33*	11112.8	13^-	(E2)	0.000680 *10*	α=0.000680 *10*; α(K)=3.03×10^{-5} *5*; α(L)=2.93×10^{-6} *5*; α(M)=4.13×10^{-7} *6*; α(N+..)=0.000646 *9* α(N)=1.80×10^{-8} *3*; α(IPF)=0.000646 *9*
14201.0	(15^+)	848.0 *3*	100	13353.0	(14^+)	M1+E2	0.00032 *5*	α=0.00032 *5*; α(K)=0.00029 *4*; α(L)=2.8×10^{-5} *4*; α(M)=4.0×10^{-6} *6*; α(N+..)=1.71×10^{-7} *23* α(N)=1.71×10^{-7} *23*
14463.7	15^+	1217.1 *3*	56 *12*	13246.3	13^+	E2	0.0001653 *24*	α=0.0001653 *24*; α(K)=0.0001383 *20*; α(L)=1.350×10^{-5} *19*; α(M)=1.90×10^{-6} *3* α(N)=8.19×10^{-8} *12*; α(IPF)=1.153×10^{-5} *17*

$^{60}_{28}Ni_{32}$-51

Adopted Levels, Gammas (continued)

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ	E_f	J^π_f	Mult.#	δ@	α†	Comments
14463.7	15^+	1604.3 4	38 6	12859.3	13^+	E2		0.000216 3	α=0.000216 3; α(K)=7.77×10^{-5} 11; α(L)=7.56×10^{-6} 11; α(M)=1.064×10^{-6} 15; α(N+..)=0.0001294 α(N)=4.60×10^{-8} 7; α(IPF)=0.0001293 19
		1688.8 4	50 6	12774.7	14^+	M1(+E2)		0.000224 21	α=0.000224 21; α(K)=6.80×10^{-5} 25; α(L)=6.61×10^{-6} 24; α(M)=9.3×10^{-7} 4; α(N+..)=0.000148 18 α(N)=4.04×10^{-8} 14; α(IPF)=0.000148 18
		1722.0 4	100 6	12742.1	13^+	E2		0.000256 4	α=0.000256 4; α(K)=6.77×10^{-5} 10; α(L)=6.57×10^{-6} 10; α(M)=9.26×10^{-7} 13; α(N+..)=0.000181 3 α(N)=4.01×10^{-8} 6; α(IPF)=0.000181 3
		2189.9 5	13 6	12333	8^-	E1		0.000795 12	α=0.000795 12; α(K)=2.57×10^{-5} 4; α(L)=2.48×10^{-6} 4; α(M)=3.49×10^{-7} 5; α(N+..)=0.000766 11 α(N)=1.516×10^{-8} 22; α(IPF)=0.000766 11
14645.5	16^+	1870.8 5	100	12774.7	14^+	E2		0.000314 5	α=0.000314 5; α(K)=5.78×10^{-5} 8; α(L)=5.61×10^{-6} 8; α(M)=7.90×10^{-7} 11; α(N+..)=0.000250 4 α(N)=3.42×10^{-8} 5; α(IPF)=0.000250 4
14803.2	16^+	1141.1 3	100 7	13662.2	15^+	M1(+E2)	−0.01 10	0.0001552 22	α=0.0001552 22; α(K)=0.0001379 20; α(L)=1.342×10^{-5} 19; α(M)=1.89×10^{-6} 3 α(N)=8.20×10^{-8} 12; α(IPF)=1.84×10^{-6} 3
		2224.5 5	29 7	12578.4	14^+	E2		0.000469 7	α=0.000469 7; α(K)=4.22×10^{-5} 6; α(L)=4.09×10^{-6} 6; α(M)=5.76×10^{-7} 8; α(N+..)=0.000422 6 α(N)=2.50×10^{-8} 4; α(IPF)=0.000422 6
14933.9	16^+	1651.7 4	27 7	13282.3	(14^+)	(E2)		0.000231 4	α=0.000231 4; α(K)=7.34×10^{-5} 11; α(L)=7.13×10^{-6} 10; α(M)=1.005×10^{-6} 14; α(N+..)=0.0001500 α(N)=4.35×10^{-8} 6; α(IPF)=0.0001499 21
		2158.9 5	100 13	12774.7	14^+	E2		0.000439 7	α=0.000439 7; α(K)=4.45×10^{-5} 7; α(L)=4.31×10^{-6} 6; α(M)=6.08×10^{-7} 9; α(N+..)=0.000390 6 α(N)=2.64×10^{-8} 4; α(IPF)=0.000390 6
15164.8	(16^+)	963.8 3	100	14201.0	(15^+)	(M1+E2)		0.000239 25	α=0.000239 25; α(K)=0.000215 23; α(L)=2.10×10^{-5} 23; α(M)=3.0×10^{-6} 4; α(N+..)=1.28×10^{-7} 13 α(N)=1.28×10^{-7} 13
15281.5	(16^-)	2243.9 5	100	13037.5	14^-	(E2)		0.000477 7	α=0.000477 7; α(K)=4.16×10^{-5} 6; α(L)=4.03×10^{-6} 6; α(M)=5.67×10^{-7} 8; α(N+..)=0.000431 6 α(N)=2.46×10^{-8} 4; α(IPF)=0.000431 6
16026.6	17^+	1381.2 4	3 1	14645.5	16^+	M1+E2		0.000154 12	α=0.000154 12; α(K)=0.000100 6; α(L)=9.8×10^{-6} 6; α(M)=1.38×10^{-6} 8; α(N+..)=4.2×10^{-5} 7 α(N)=6.0×10^{-8} 3; α(IPF)=4.2×10^{-5} 7
		1562.9 4	100 5	14463.7	15^+	E2		0.000203 3	α=0.000203 3; α(K)=8.18×10^{-5} 12; α(L)=7.96×10^{-6} 12; α(M)=1.121×10^{-6} 16; α(N+..)=0.0001119 α(N)=4.85×10^{-8} 7; α(IPF)=0.0001118 16
16098.1	(17^+)	1294.8 1	100	14803.2	16^+	(M1+E2)		0.000151 11	α=0.000151 11; α(K)=0.000114 7; α(L)=1.11×10^{-5} 7; α(M)=1.57×10^{-6} 10; α(N+..)=2.4×10^{-5} 4 α(N)=6.8×10^{-8} 4; α(IPF)=2.3×10^{-5} 4

$^{60}_{28}Ni_{32}$-52

$\gamma(^{60}Ni)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ	E_f	J^π_f	Mult.#	α†	Comments
16194.4	17^-	2578.9 *6*	100	13615.4	15^-	E2	0.000628 *9*	α=0.000628 *9*; α(K)=3.27×10^{-5} *5*; α(L)=3.16×10^{-6} *5*; α(M)=4.46×10^{-7} *7*; α(N+..)=0.000592 *9* α(N)=1.94×10^{-8} *3*; α(IPF)=0.000592 *9*
16242.0?	(17^+)	1077[k] *1*		15164.8	(16^+)	(M1+E2)	0.000187 *16*	α=0.000187 *16*; α(K)=0.000168 *14*; α(L)=1.64×10^{-5} *15*; α(M)=2.32×10^{-6} *20*; α(N+..)=1.00×10^{-7} *9* α(N)=1.00×10^{-7} *9*
16842.4	18^+	2196.9 *5*	100	14645.5	16^+	E2	0.000456 *7*	α=0.000456 *7*; α(K)=4.31×10^{-5} *6*; α(L)=4.18×10^{-6} *6*; α(M)=5.89×10^{-7} *9*; α(N+..)=0.000408 *6* α(N)=2.56×10^{-8} *4*; α(IPF)=0.000408 *6*
17235.8	18^+	2301.9 *6*	100	14933.9	16^+	E2	0.000504 *7*	α=0.000504 *7*; α(K)=3.97×10^{-5} *6*; α(L)=3.85×10^{-6} *6*; α(M)=5.42×10^{-7} *8*; α(N+..)=0.000459 *7* α(N)=2.35×10^{-8} *4*; α(IPF)=0.000459 *7*
17911.6	19^+	1884.9 *5*	100	16026.6	17^+	E2	0.000320 *5*	α=0.000320 *5*; α(K)=5.70×10^{-5} *8*; α(L)=5.53×10^{-6} *8*; α(M)=7.79×10^{-7} *11*; α(N+..)=0.000256 *4* α(N)=3.38×10^{-8} *5*; α(IPF)=0.000256 *4*
18131.4	(18^-)	2849.9 *7*	100	15281.5	(16^-)	(E2)	0.000746 *11*	α=0.000746 *11*; α(K)=2.77×10^{-5} *4*; α(L)=2.68×10^{-6} *4*; α(M)=3.77×10^{-7} *6*; α(N+..)=0.000715 *10* α(N)=1.639×10^{-8} *23*; α(IPF)=0.000715 *10*
19238.4	(19^-)	3043.9 *7*	100	16194.4	17^-	(E2)	0.000828 *12*	α=0.000828 *12*; α(K)=2.49×10^{-5} *4*; α(L)=2.40×10^{-6} *4*; α(M)=3.39×10^{-7} *5*; α(N+..)=0.000801 *12* α(N)=1.473×10^{-8} *21*; α(IPF)=0.000801 *12*
19504.4	20^+	2661.9 *6*	100	16842.4	18^+	E2	0.000665 *10*	α=0.000665 *10*; α(K)=3.10×10^{-5} *5*; α(L)=3.00×10^{-6} *5*; α(M)=4.23×10^{-7} *6*; α(N+..)=0.000630 *9* α(N)=1.84×10^{-8} *3*; α(IPF)=0.000630 *9*
20017.9	(20^+)	2782.0 *7*	100	17235.8	18^+	(E2)	0.000717 *10*	α=0.000717 *10*; α(K)=2.88×10^{-5} *4*; α(L)=2.79×10^{-6} *4*; α(M)=3.93×10^{-7} *6*; α(N+..)=0.000685 *10* α(N)=1.706×10^{-8} *24*; α(IPF)=0.000685 *10*
20177.5	21^+	2265.9 *6*	100	17911.6	19^+	E2	0.000487 *7*	α=0.000487 *7*; α(K)=4.08×10^{-5} *6*; α(L)=3.96×10^{-6} *6*; α(M)=5.58×10^{-7} *8*; α(N+..)=0.000442 *7* α(N)=2.42×10^{-8} *4*; α(IPF)=0.000442 *7*
22863.5	(22^+)	3359.0 *8*	100	19504.4	20^+	(E2)	0.000955 *14*	α=0.000955 *14*; α(K)=2.13×10^{-5} *3*; α(L)=2.05×10^{-6} *3*; α(M)=2.89×10^{-7} *4*; α(N+..)=0.000932 *13* α(N)=1.259×10^{-8} *18*; α(IPF)=0.000932 *13*
22996.5	23^+	2818.9 *7*	100	20177.5	21^+	E2	0.000733 *11*	α=0.000733 *11*; α(K)=2.82×10^{-5} *4*; α(L)=2.73×10^{-6} *4*; α(M)=3.84×10^{-7} *6*; α(N+..)=0.000701 *10* α(N)=1.669×10^{-8} *24*; α(IPF)=0.000701 *10*

† Additional information 3.
‡ From (^{36}Ar,4pγ), unless given otherwise. For additional γ's from unbound states, see ^{59}Co(p,γ).
# Multipolarity from $\gamma(\theta)$ in ^{56}Fe(^{7}Li,2npγ); character (E or M) from RUL or ΔJ^π, except as noted.

$^{60}_{28}Ni_{32}$-53

$\gamma(^{60}Ni)$ (continued)

[@] From ^{56}Fe(^{7}Li,2npγ), except as noted.
[&] From ^{59}Co(p,γ).
[a] From ^{60}Cu ε decay.
[b] From ^{60}Co β^{-} decay (1925.28 d).
[c] From ^{60}Ni(p,p$'\gamma$).
[d] From ^{60}Ni(p,p$'\gamma$).
[e] From ^{56}Fe(^{7}Li,2npγ).
[f] From ^{59}Co(^{3}He,dγ). Eγ deduced from level separation and not included in energy fit.
[g] From ^{59}Co(^{3}He,dγ). Eγ deduced from level separation and not included in energy fit.
[h] From ^{28}Si(^{35}Cl,3p).
[i] From ^{59}Ni(n,γ) E=thermal.
[j] From (γ,γ'),(pol γ,γ').
[k] Placement of transition in the level scheme is uncertain.

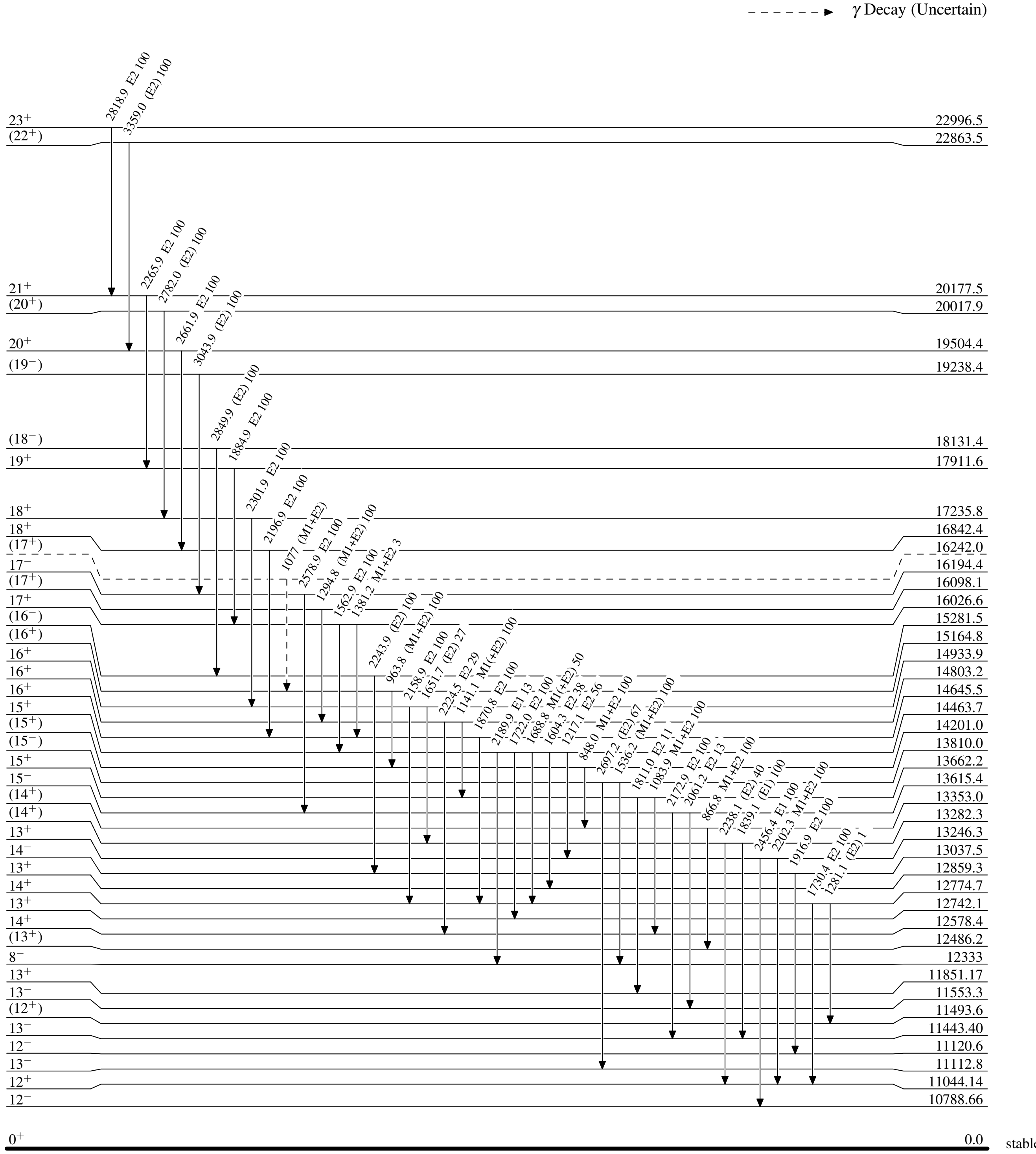
$^{60}_{28}Ni_{32}$-54

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

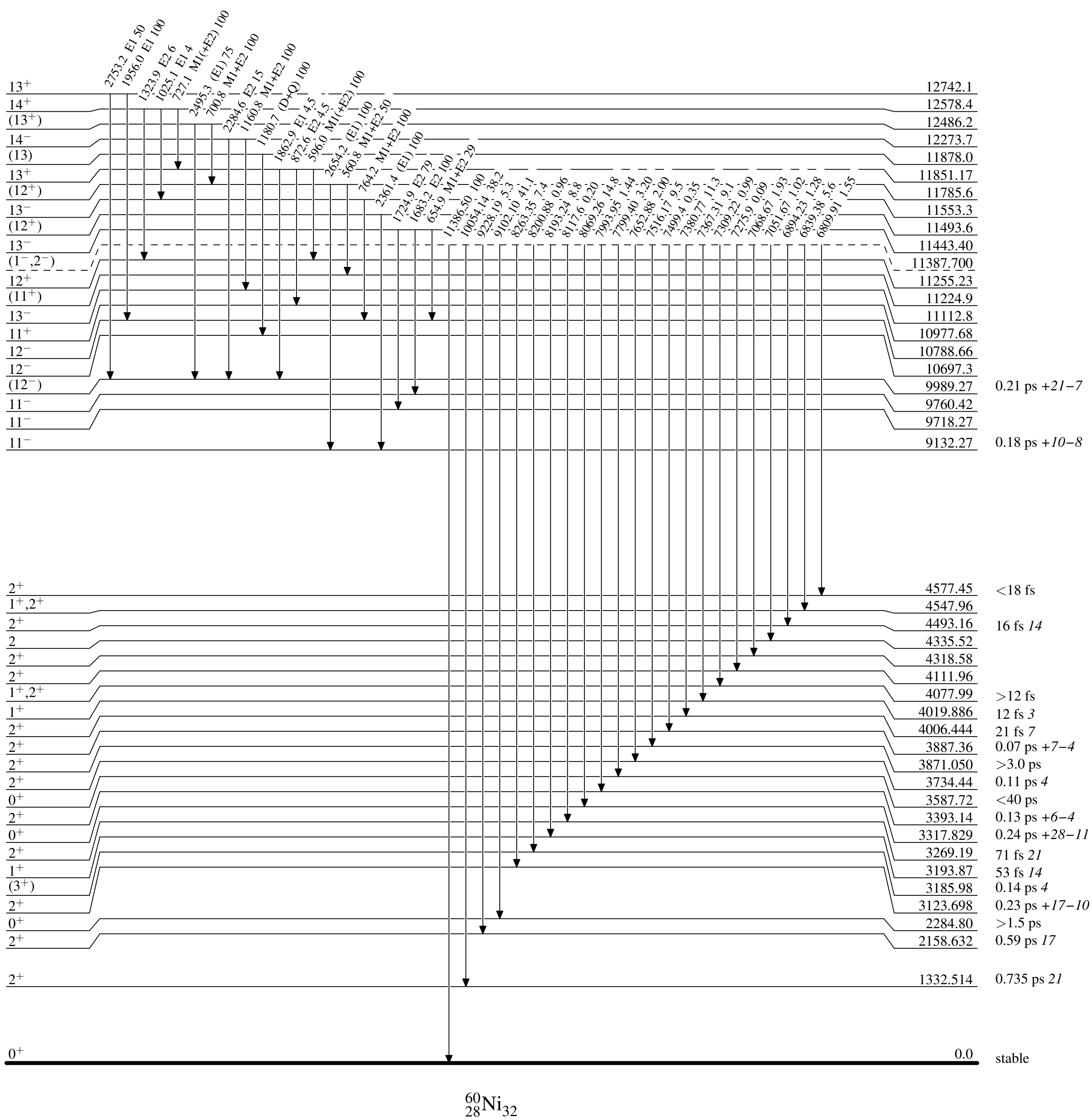


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

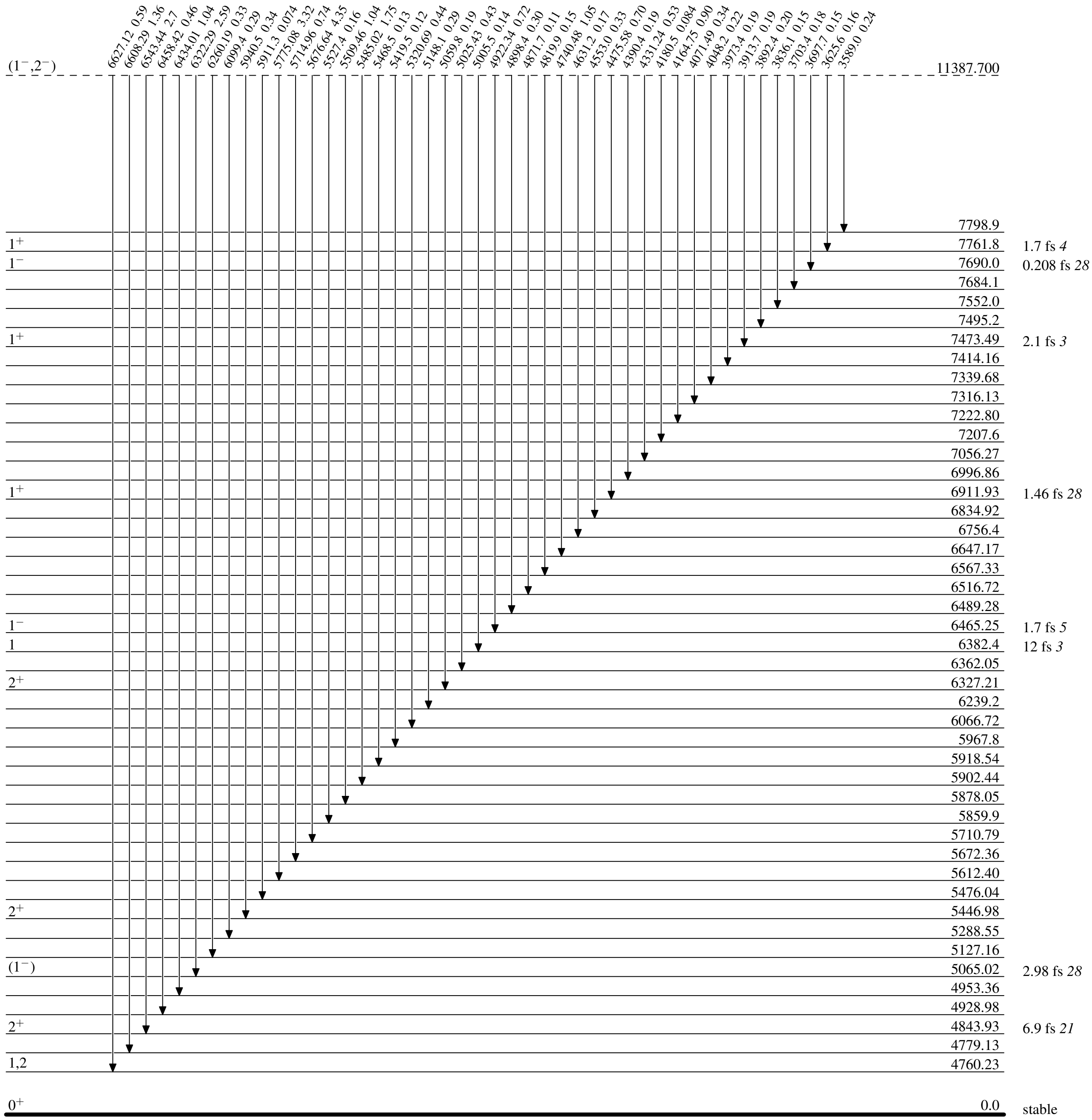
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

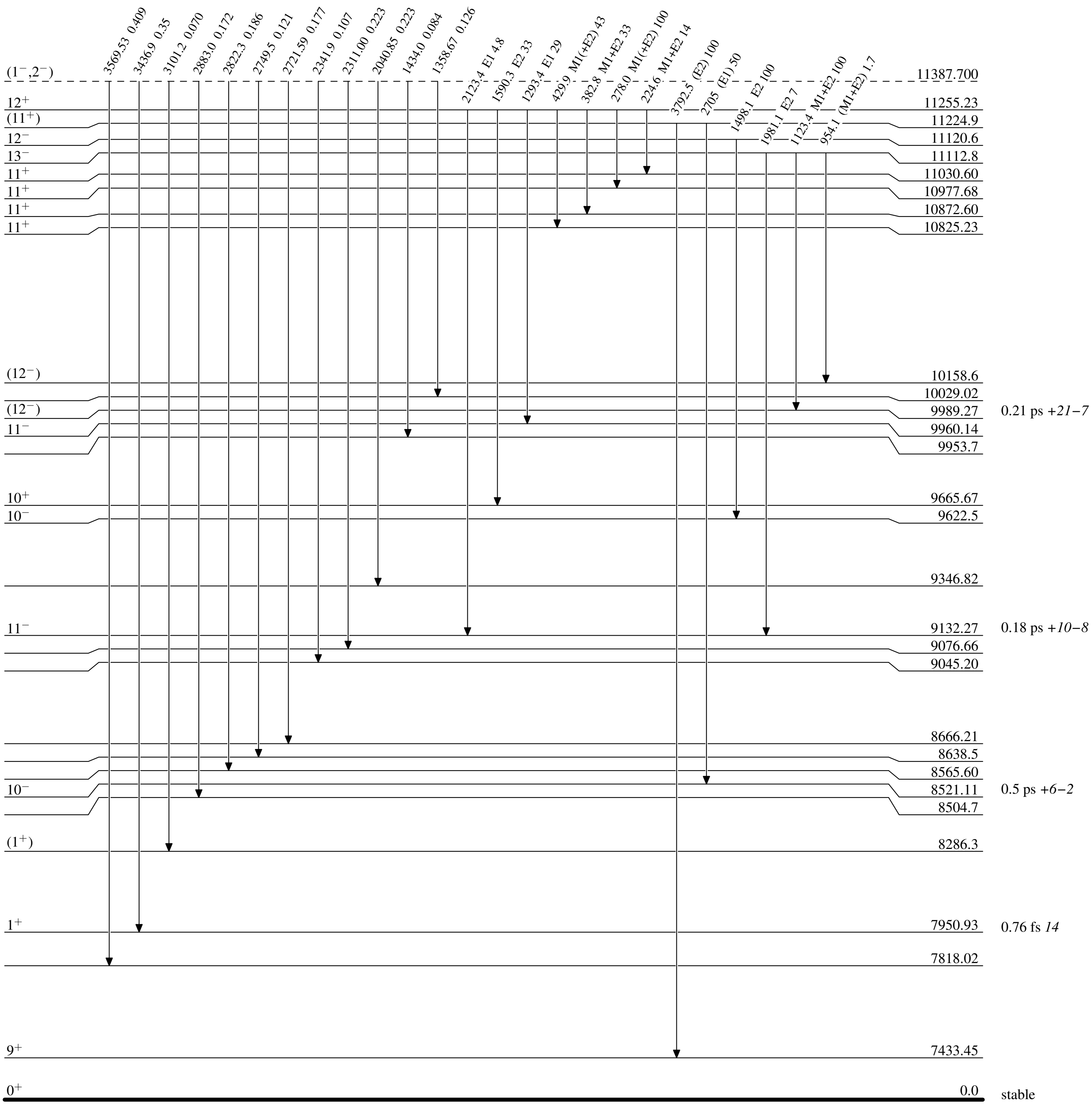


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

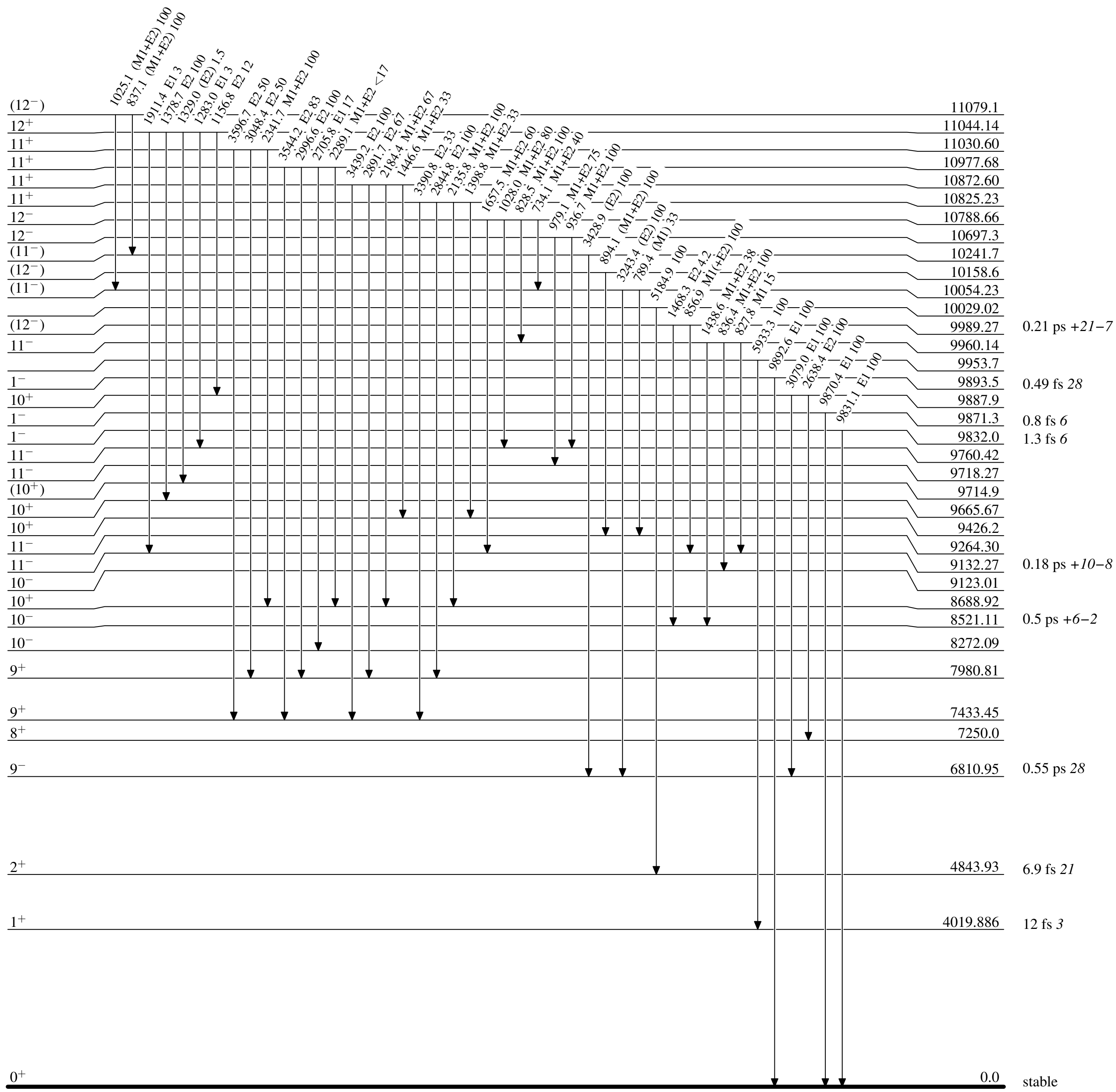


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

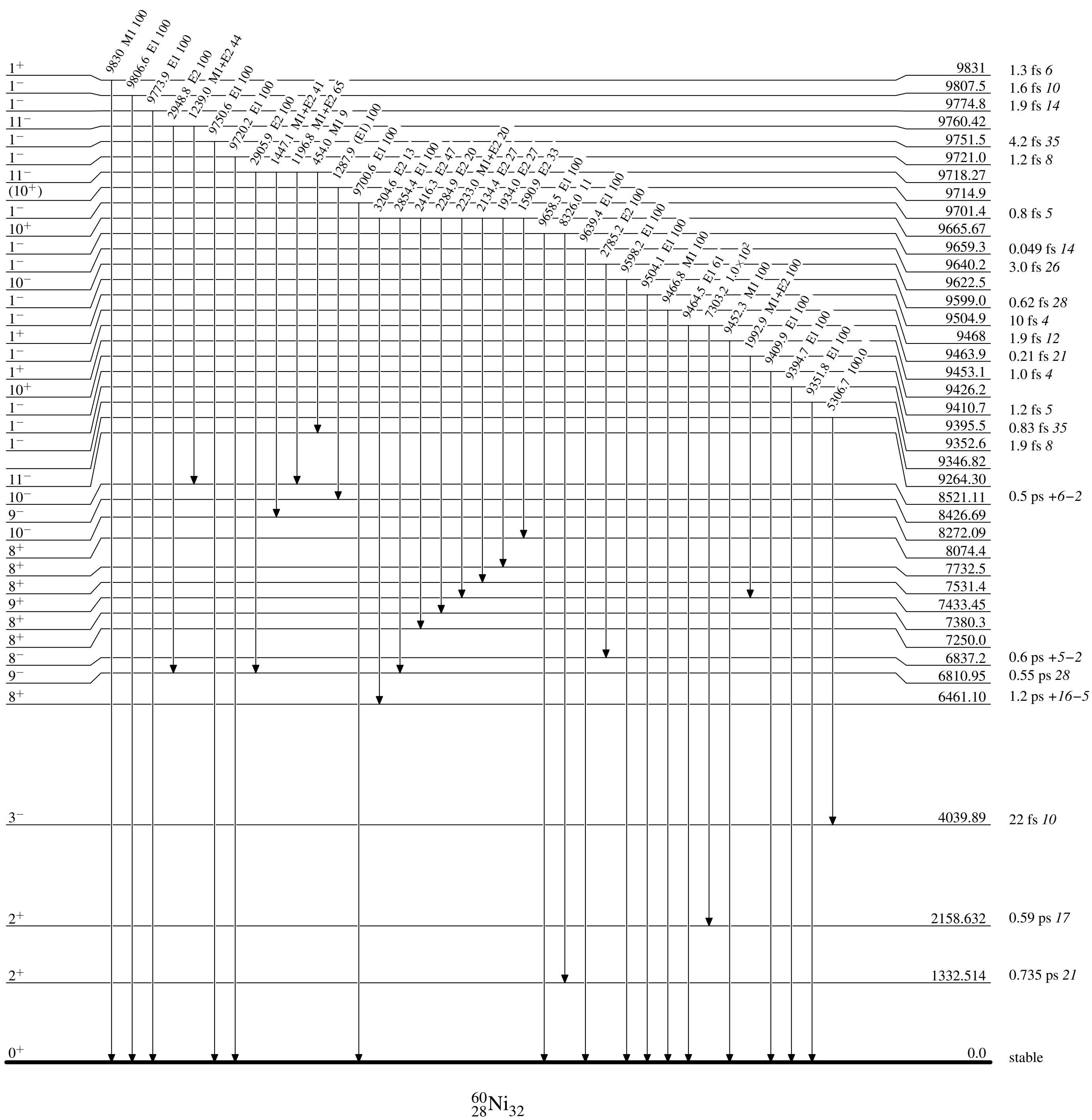


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

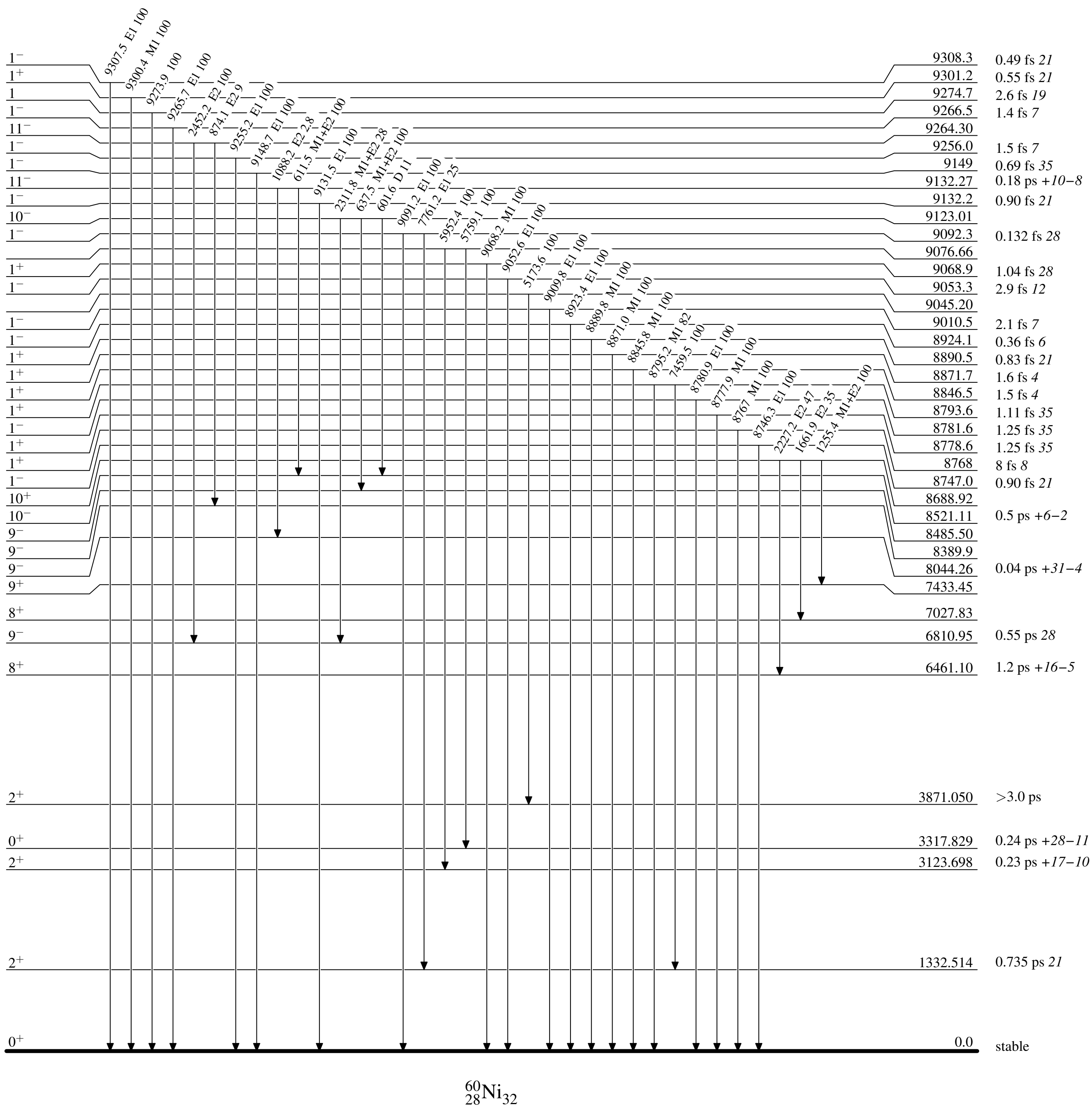
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

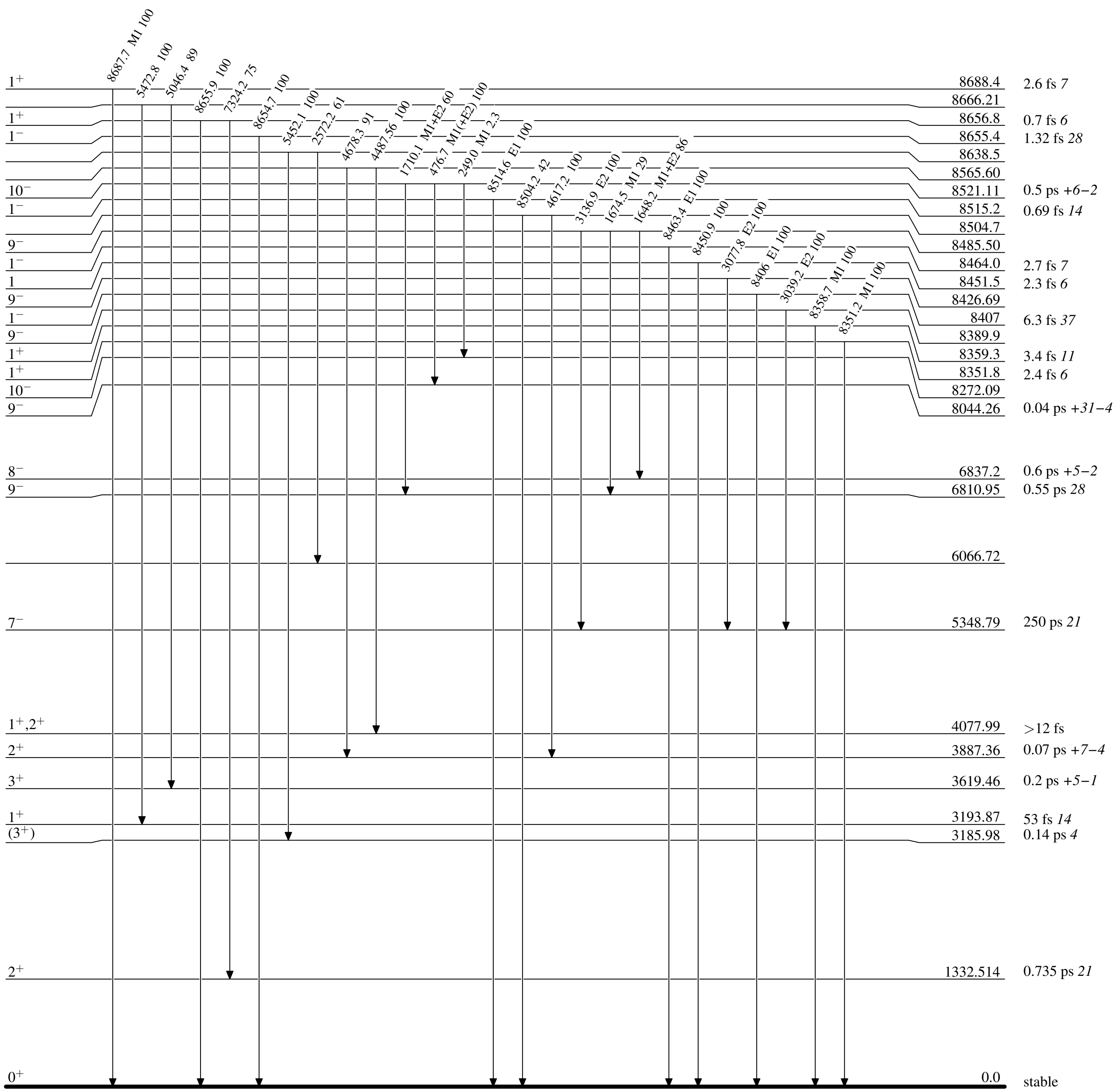
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

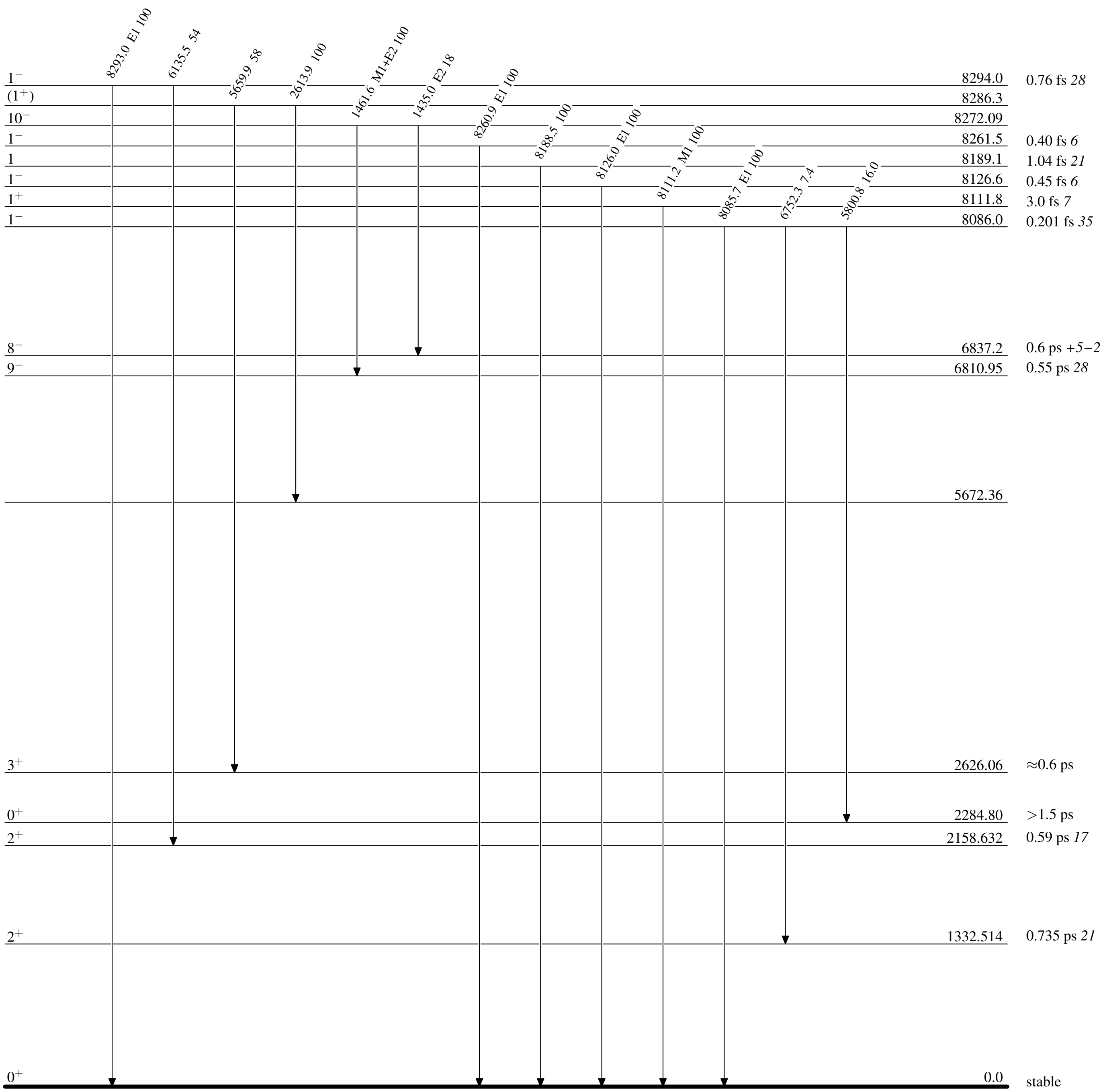


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

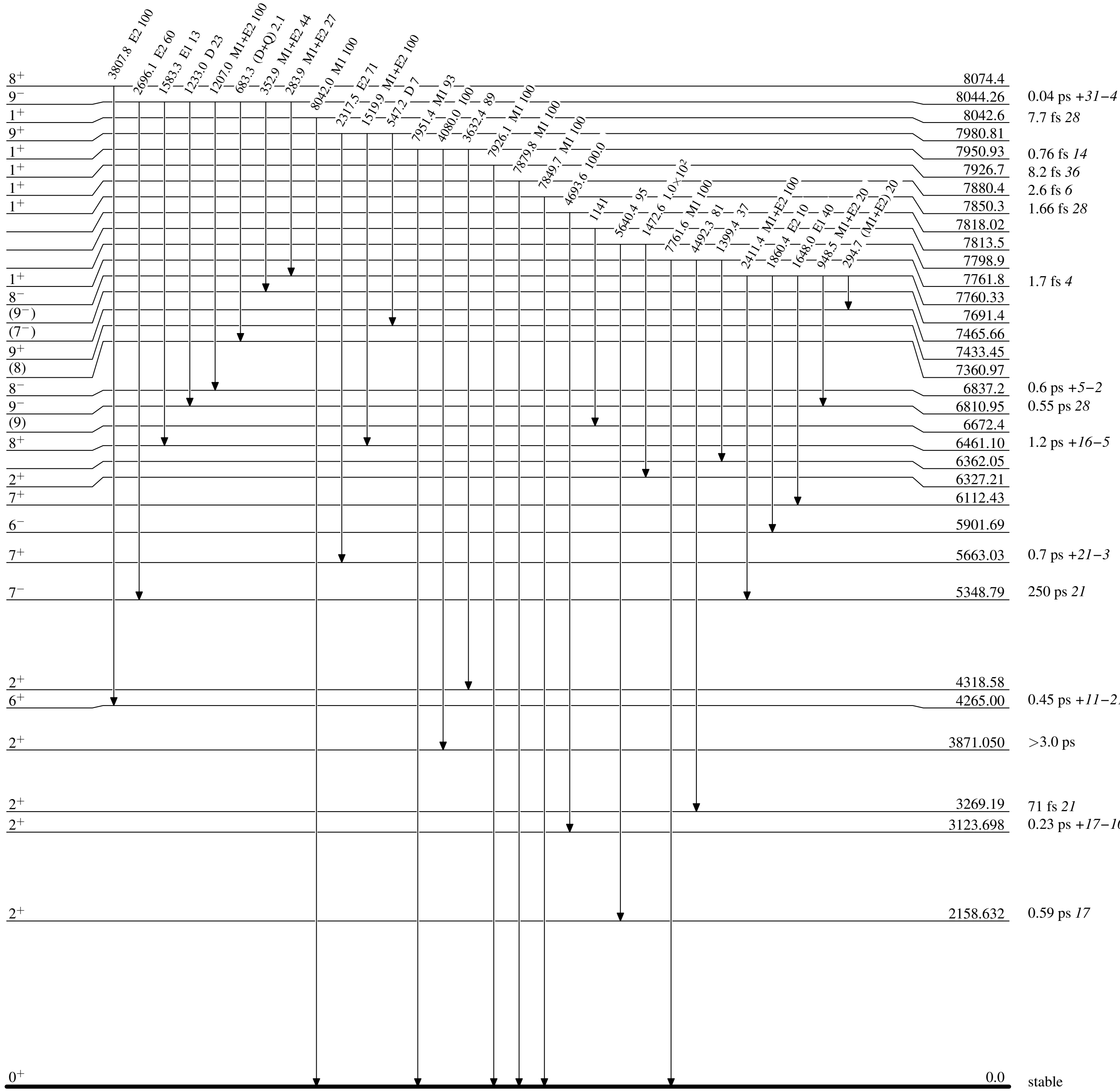


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

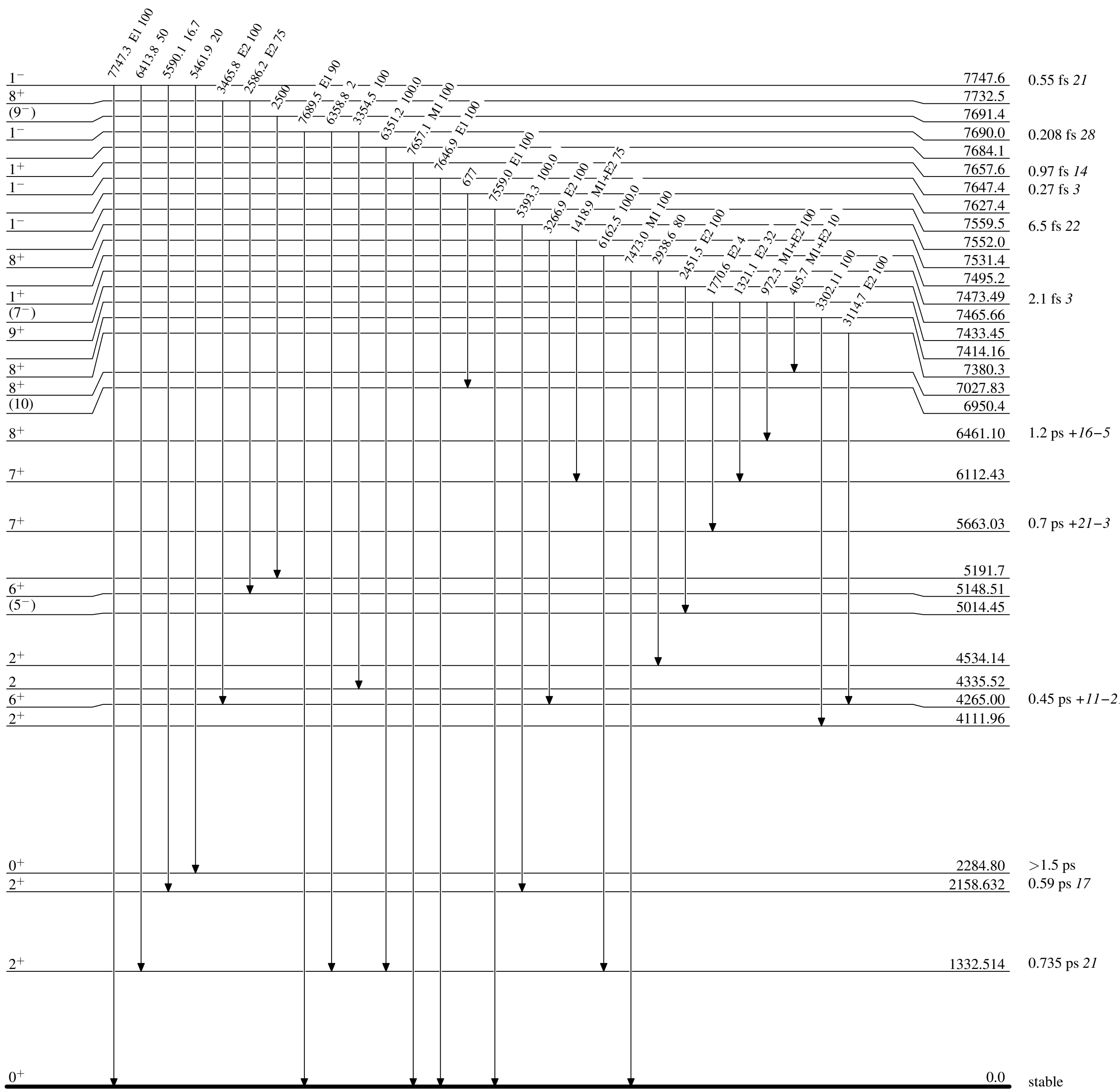


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

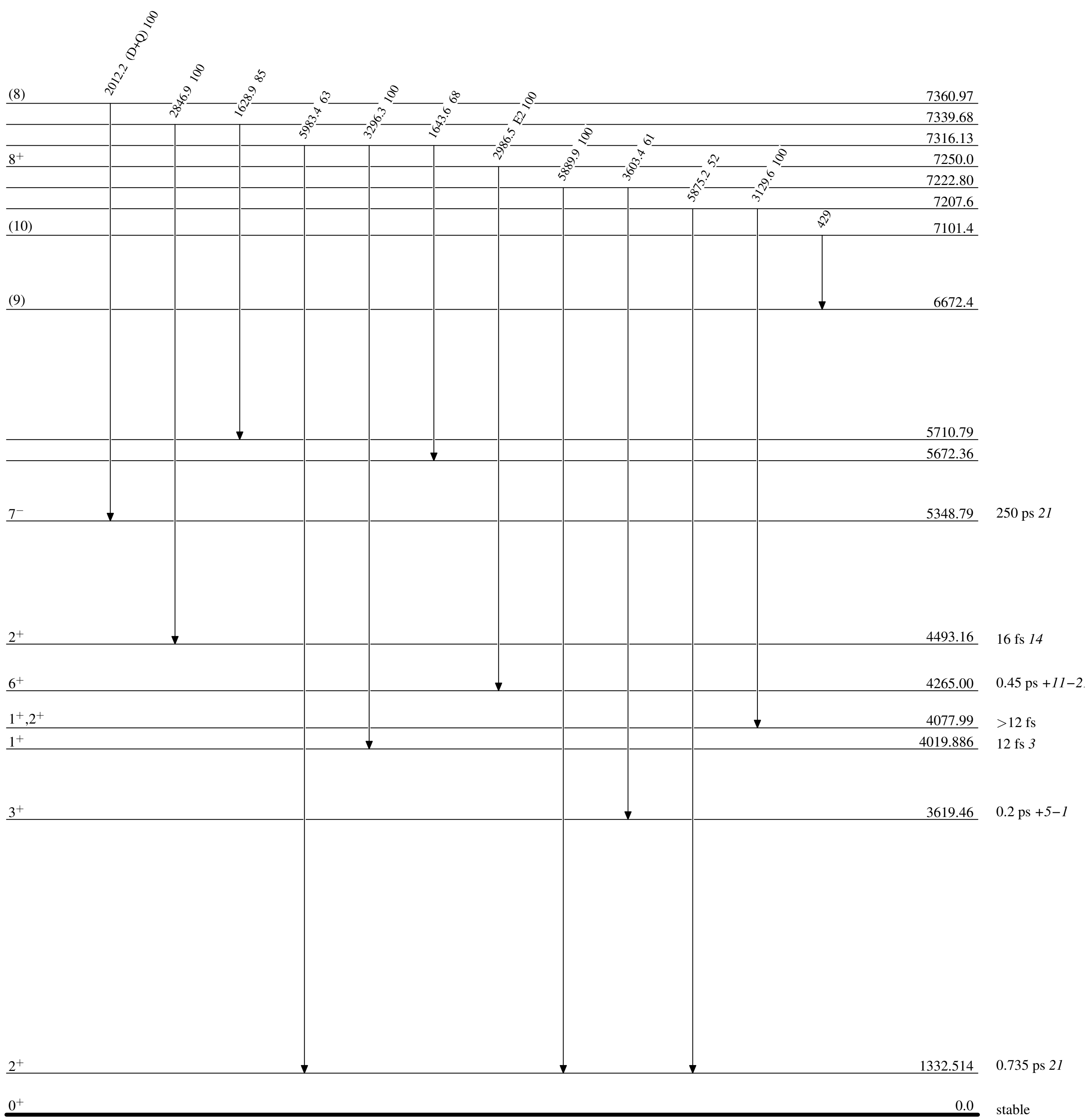


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

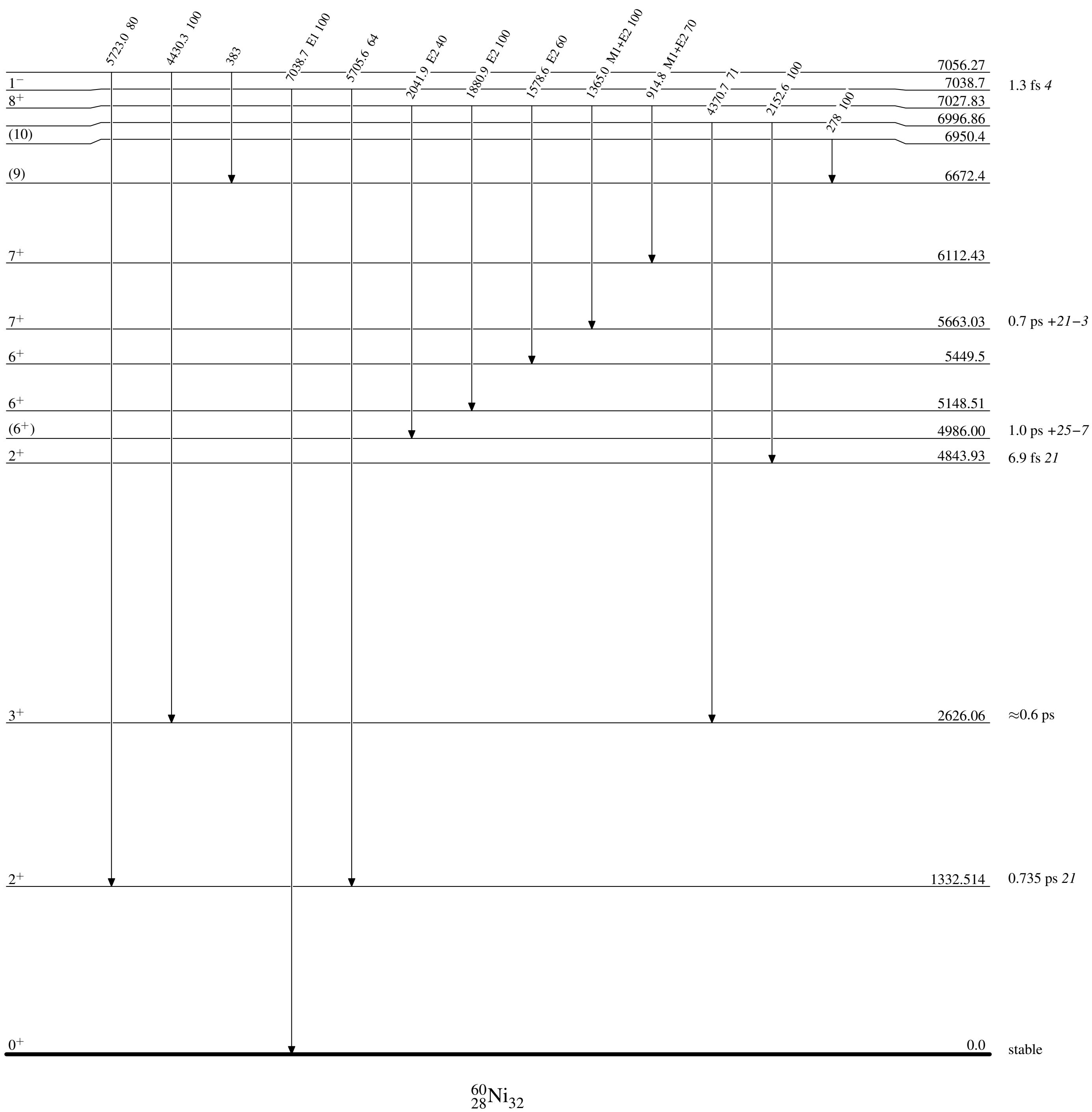


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

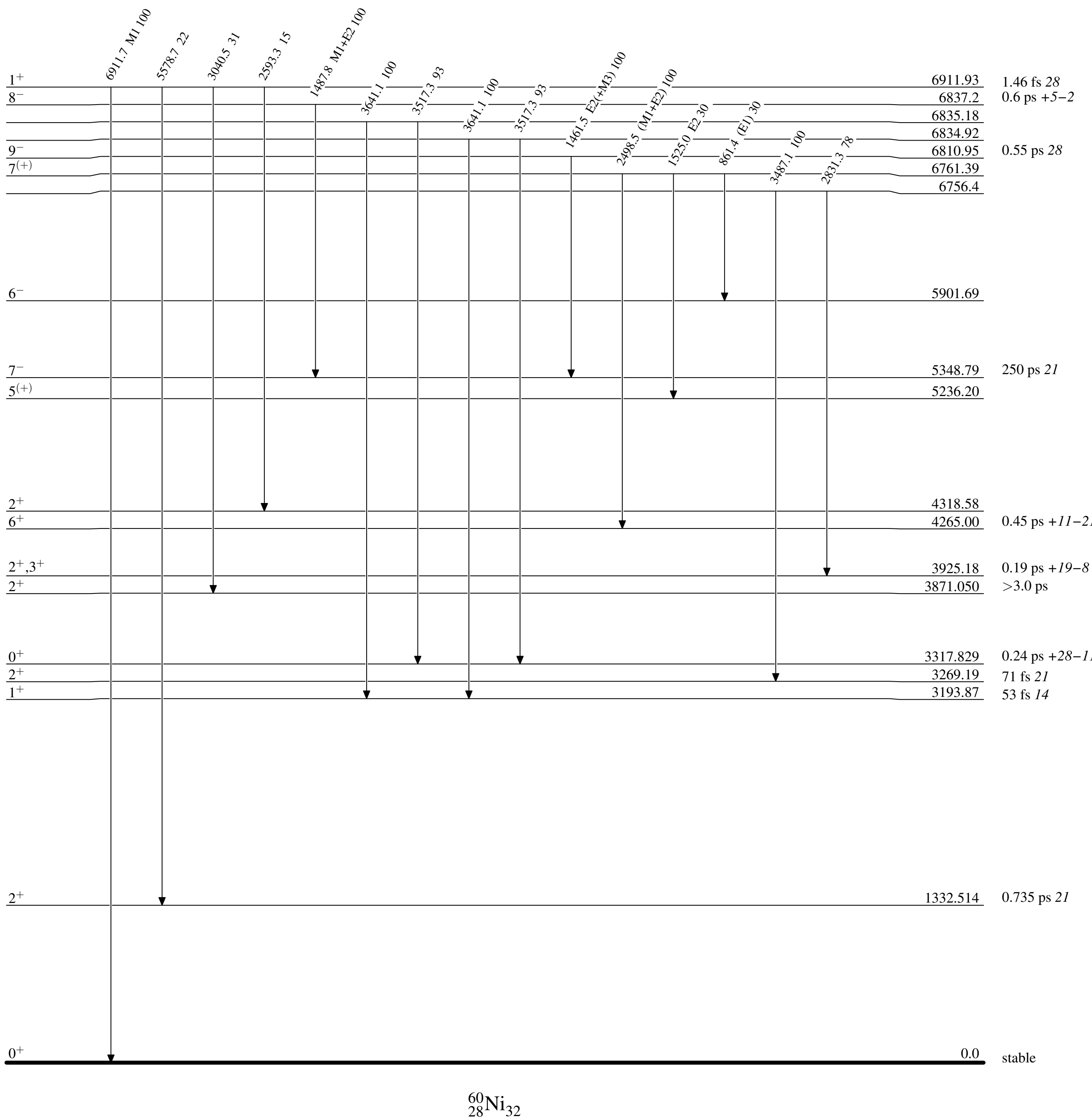
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

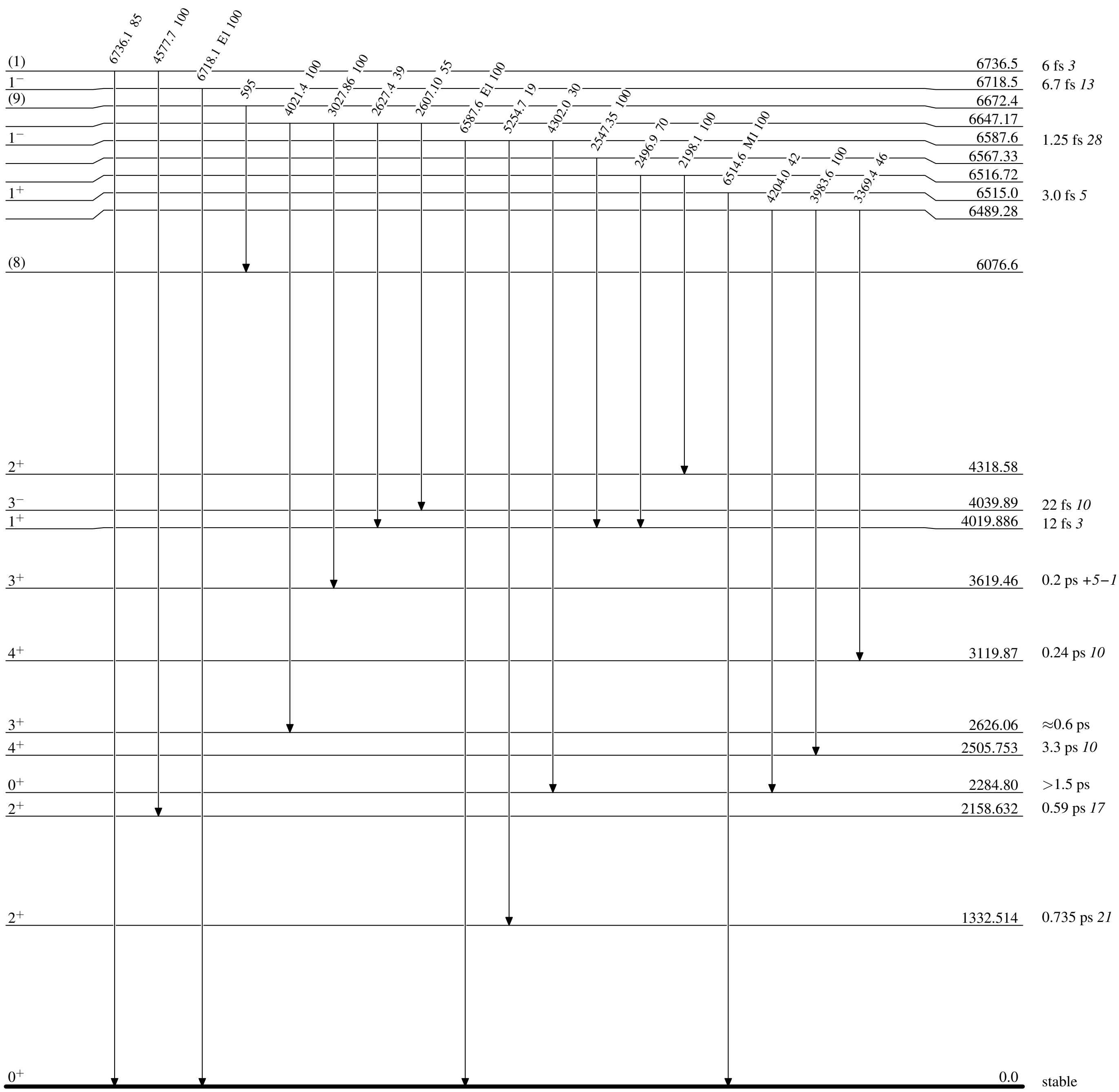
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

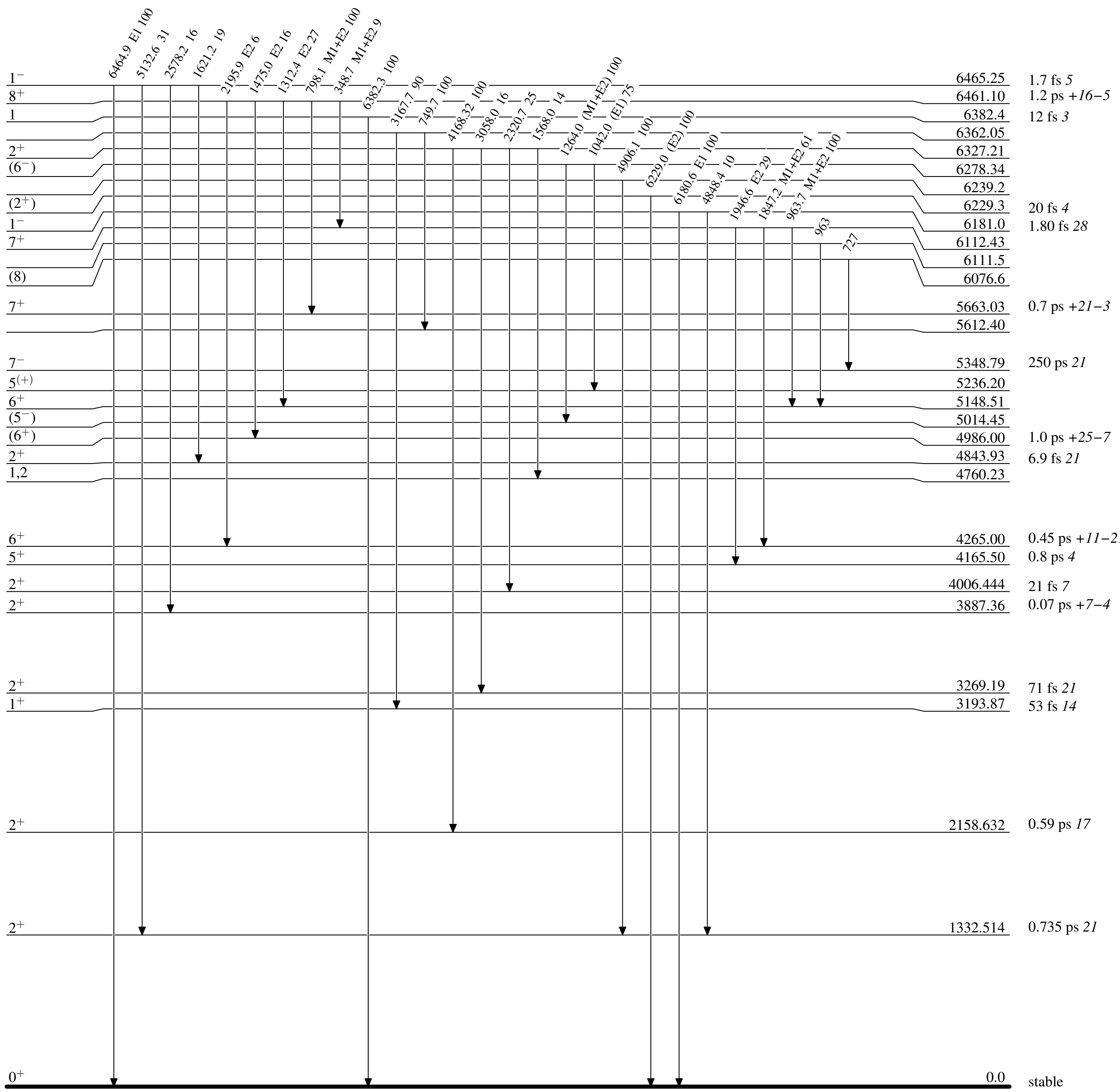


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{60}_{28}Ni_{32}$

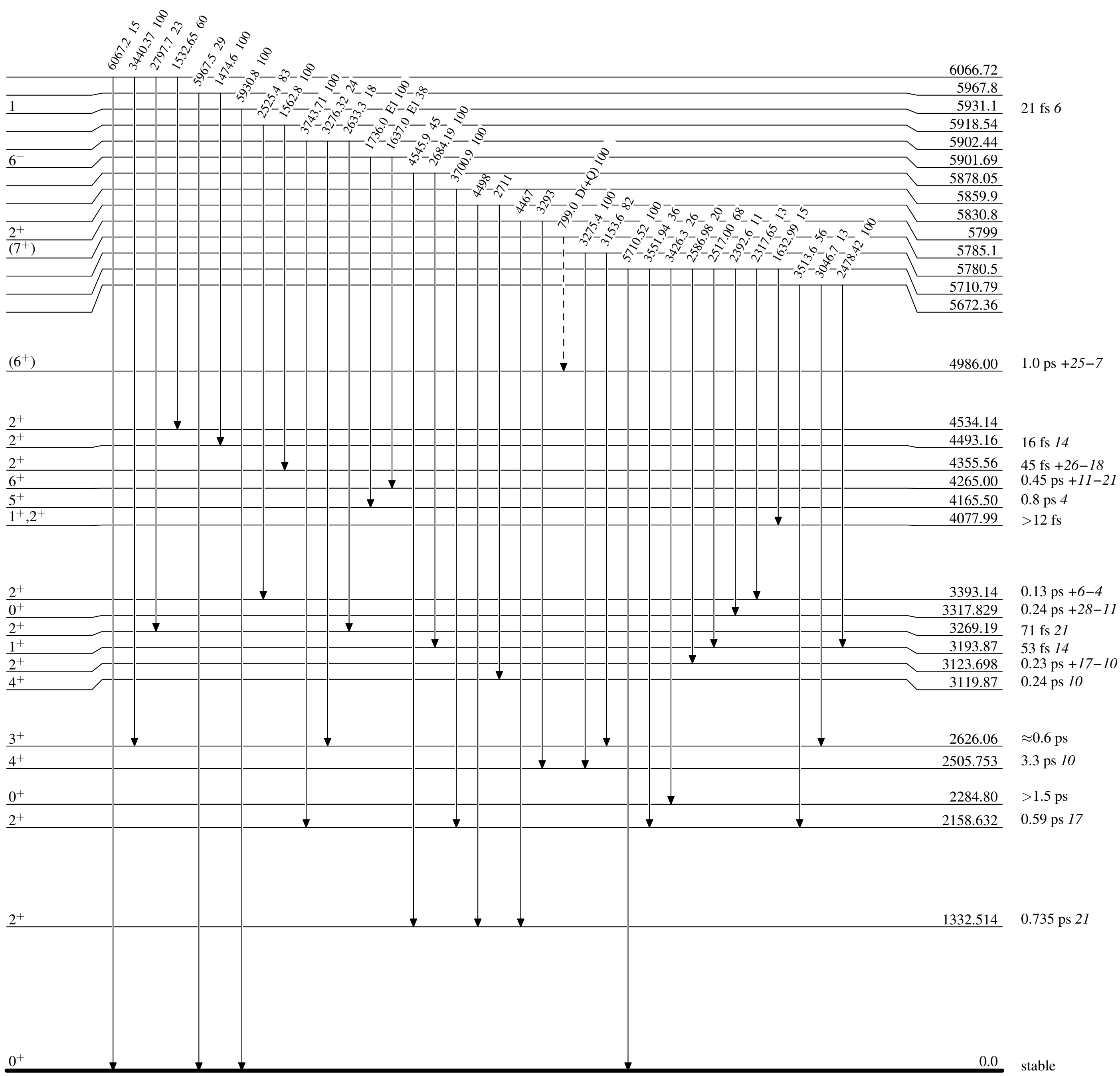
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

- - - - - -► γ Decay (Uncertain)

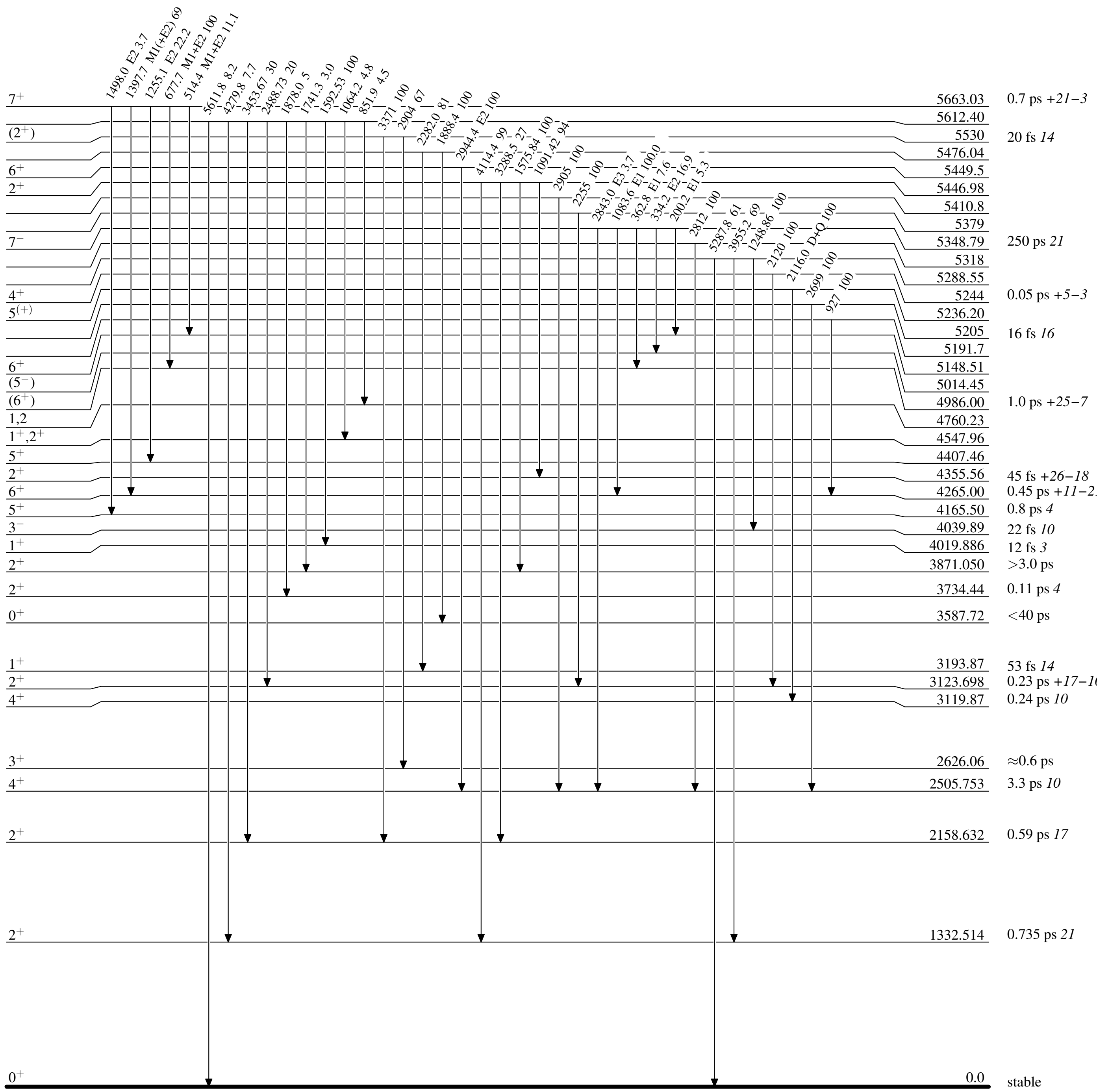


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

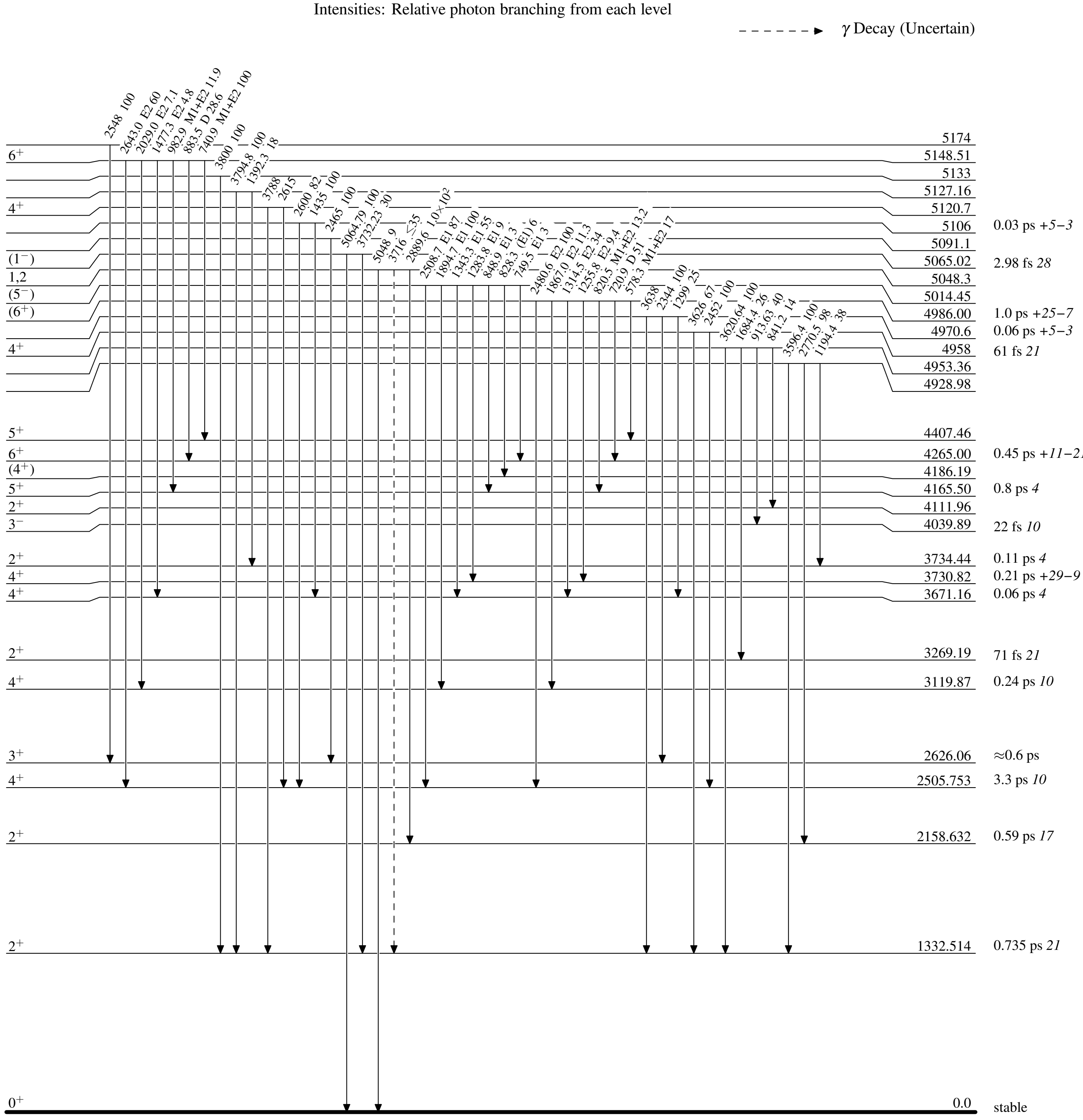


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

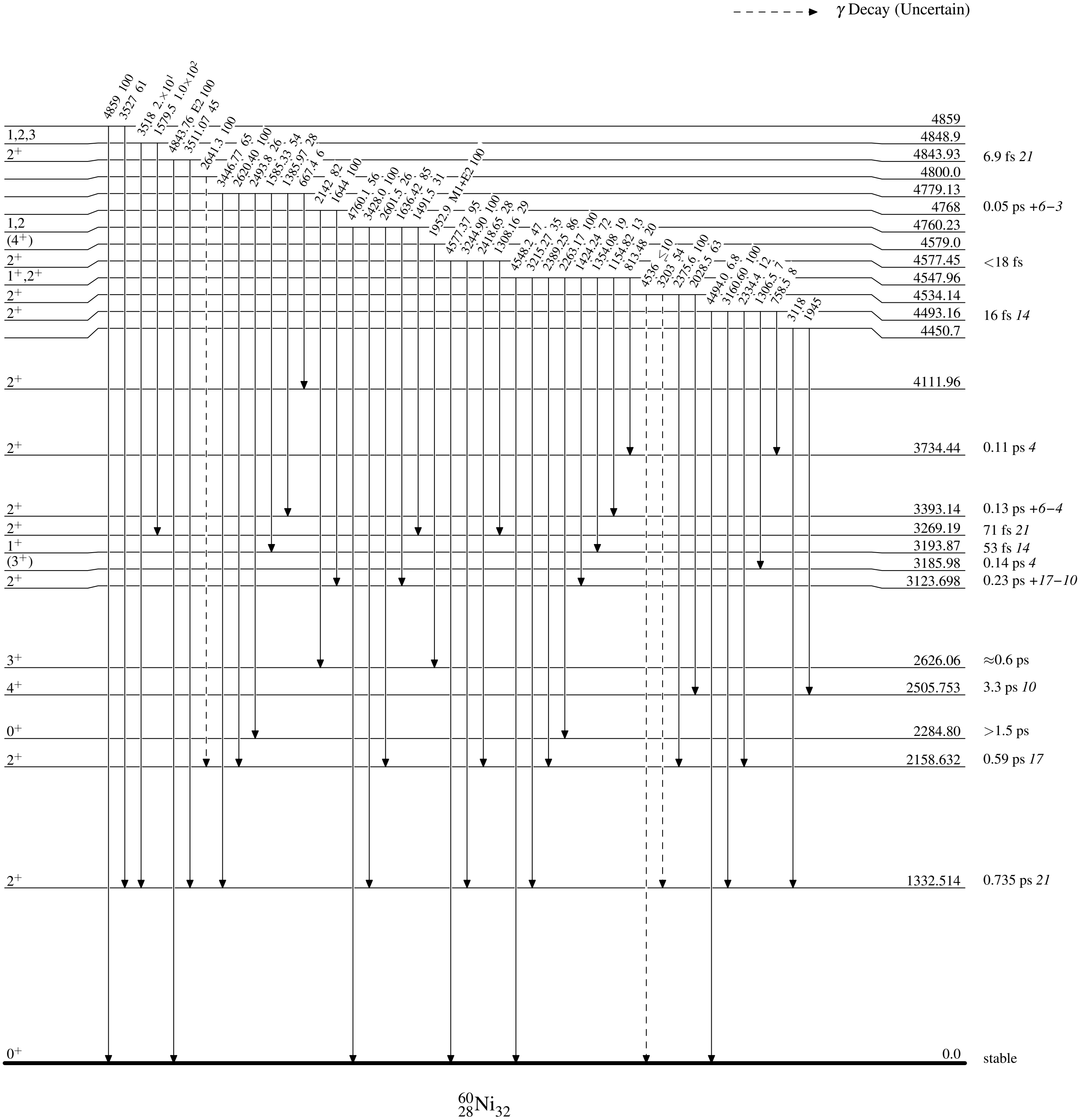


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

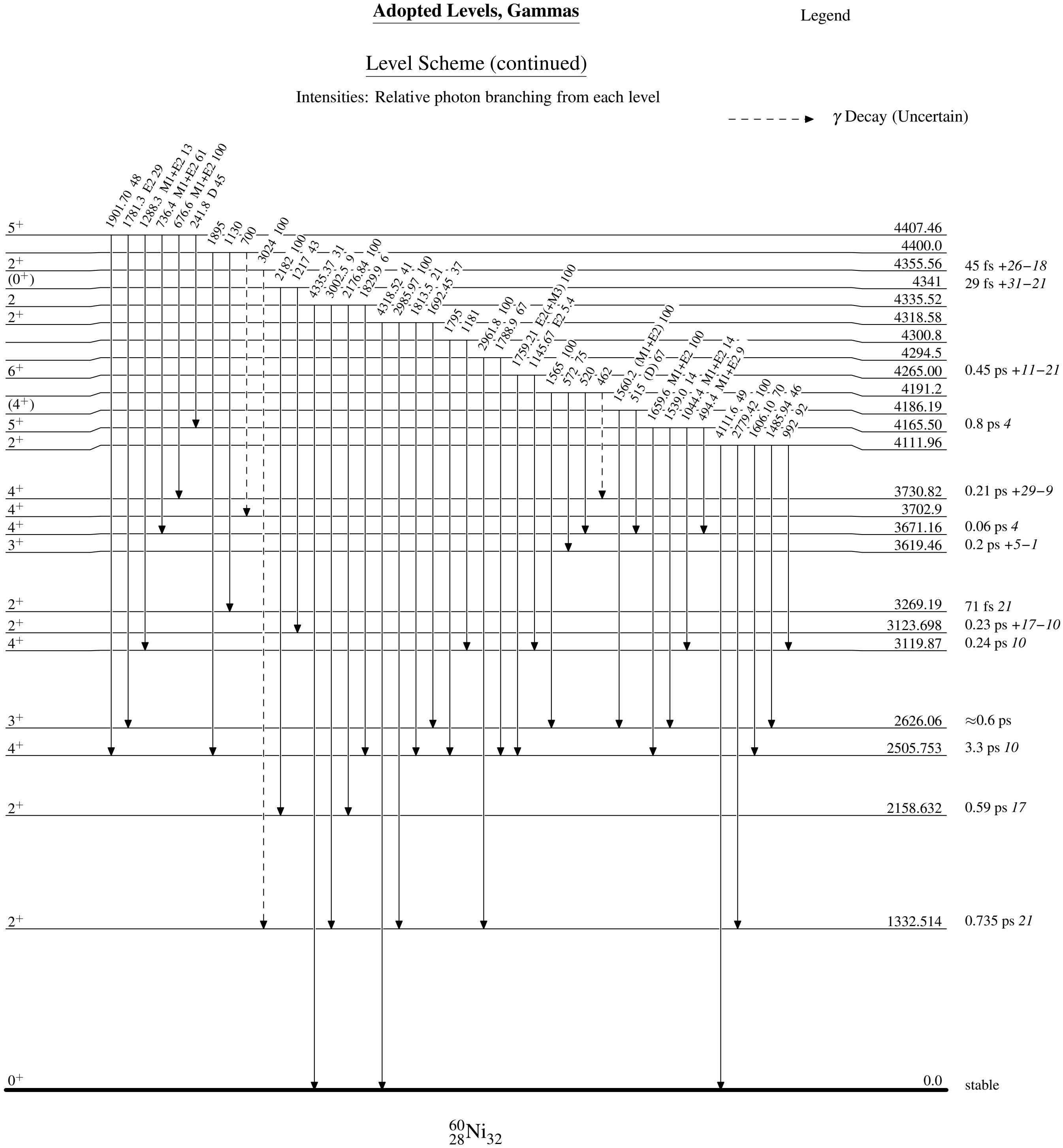
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



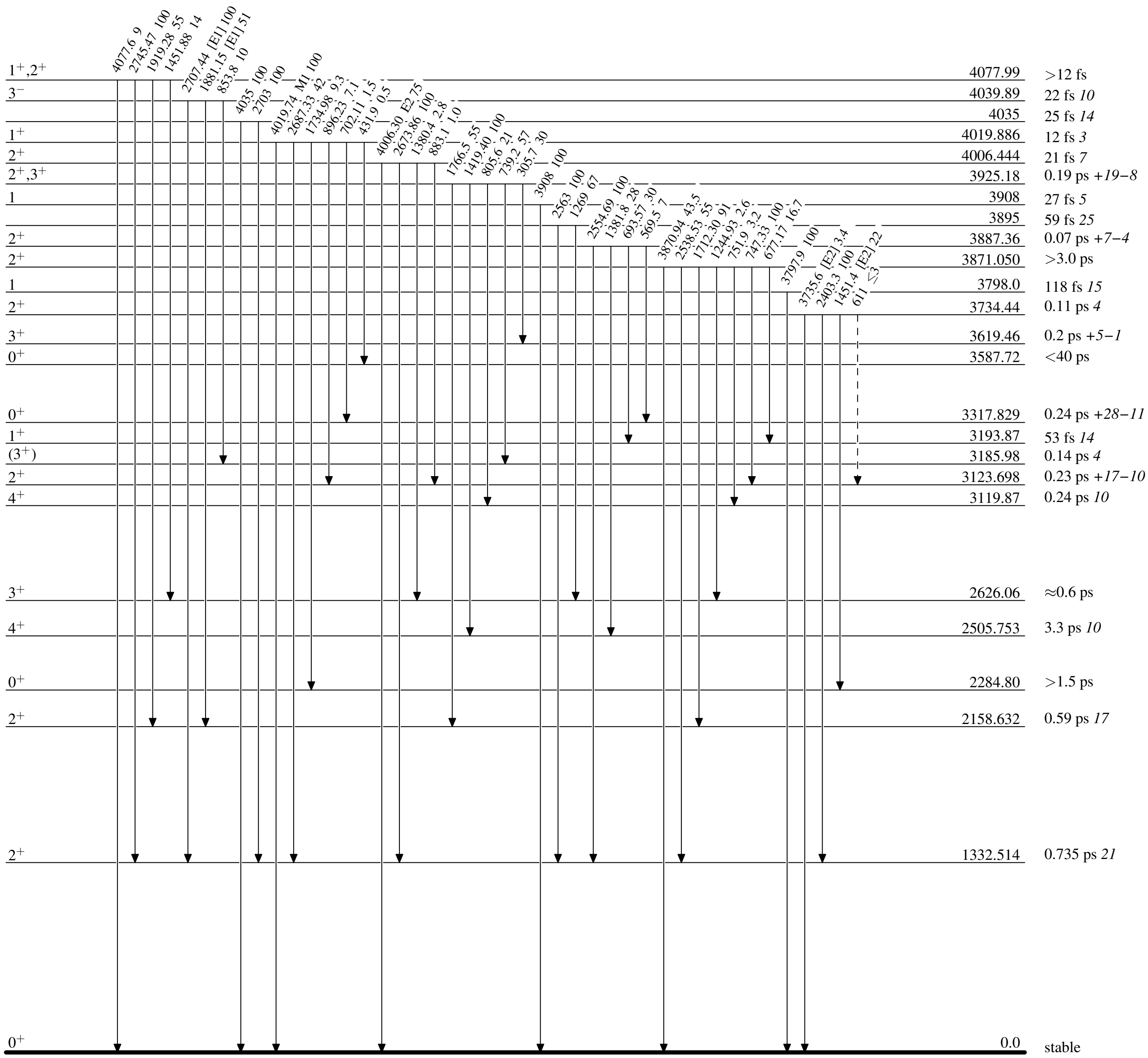
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

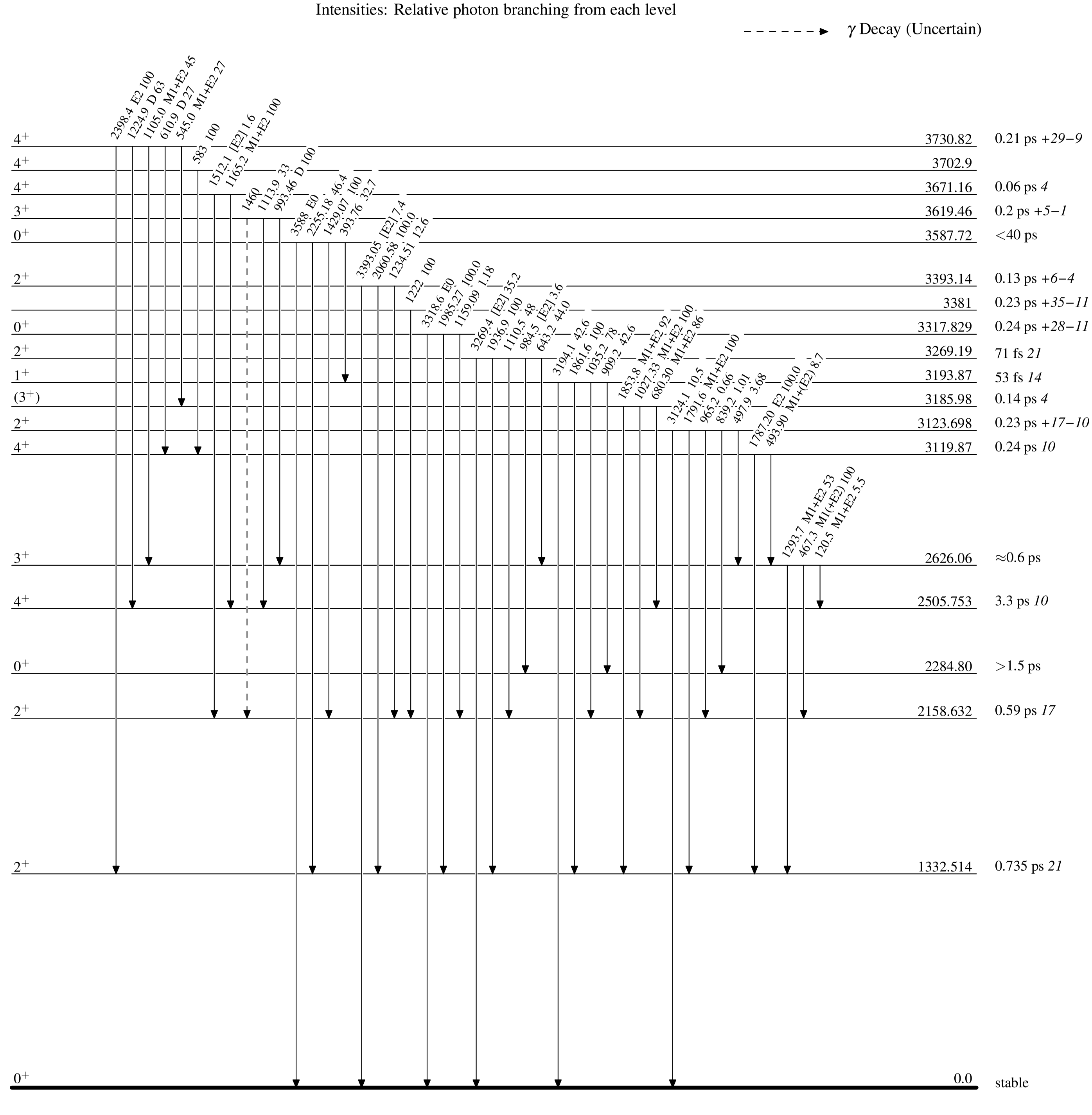


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

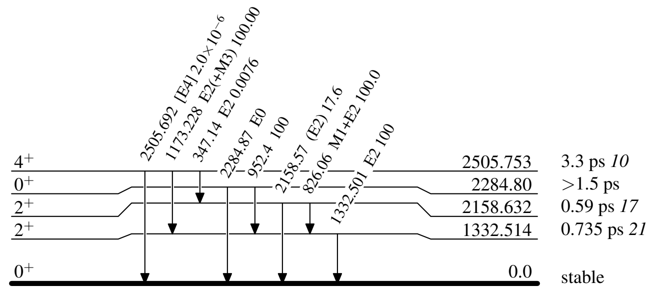


$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

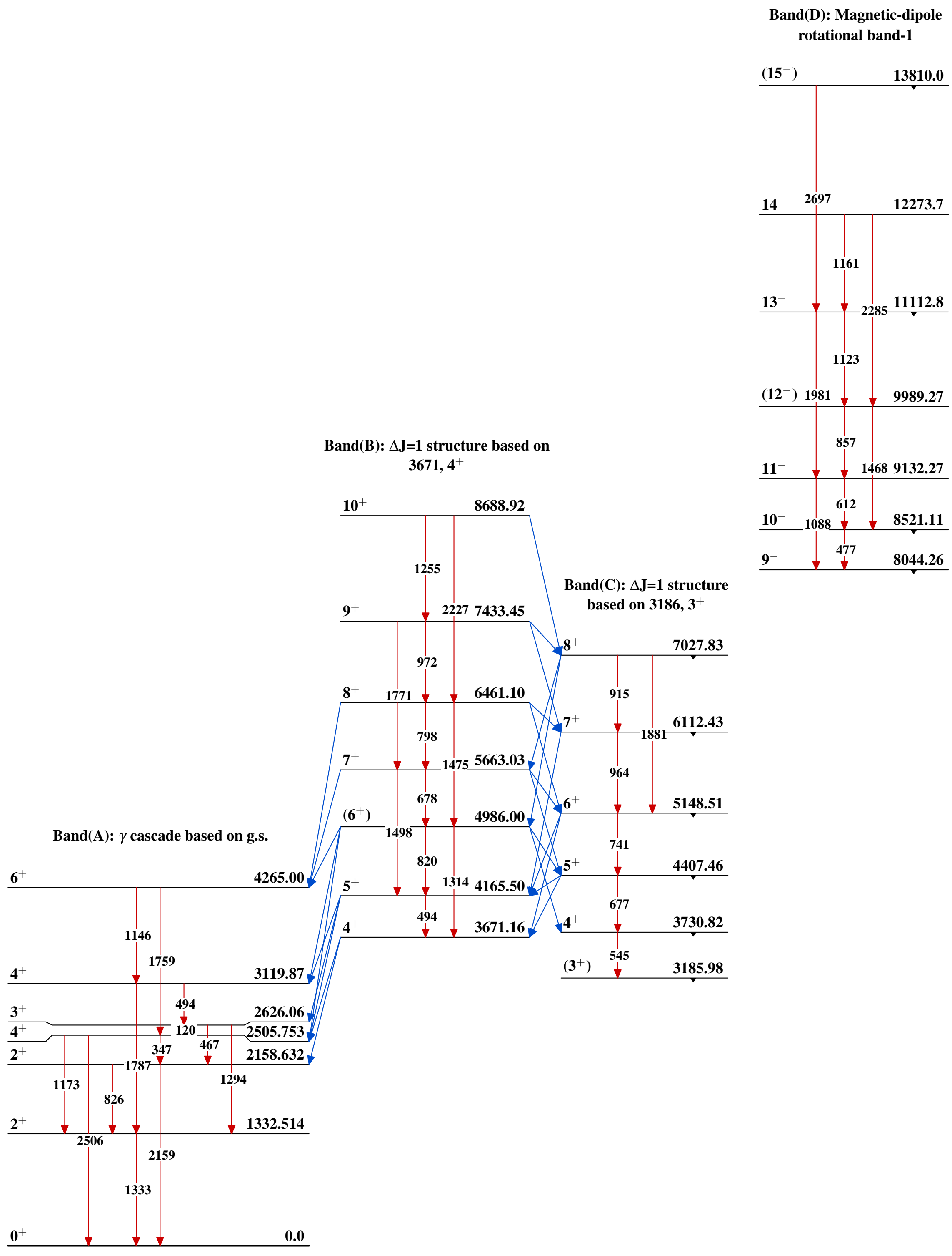
Level Scheme (continued)

Intensities: Relative photon branching from each level



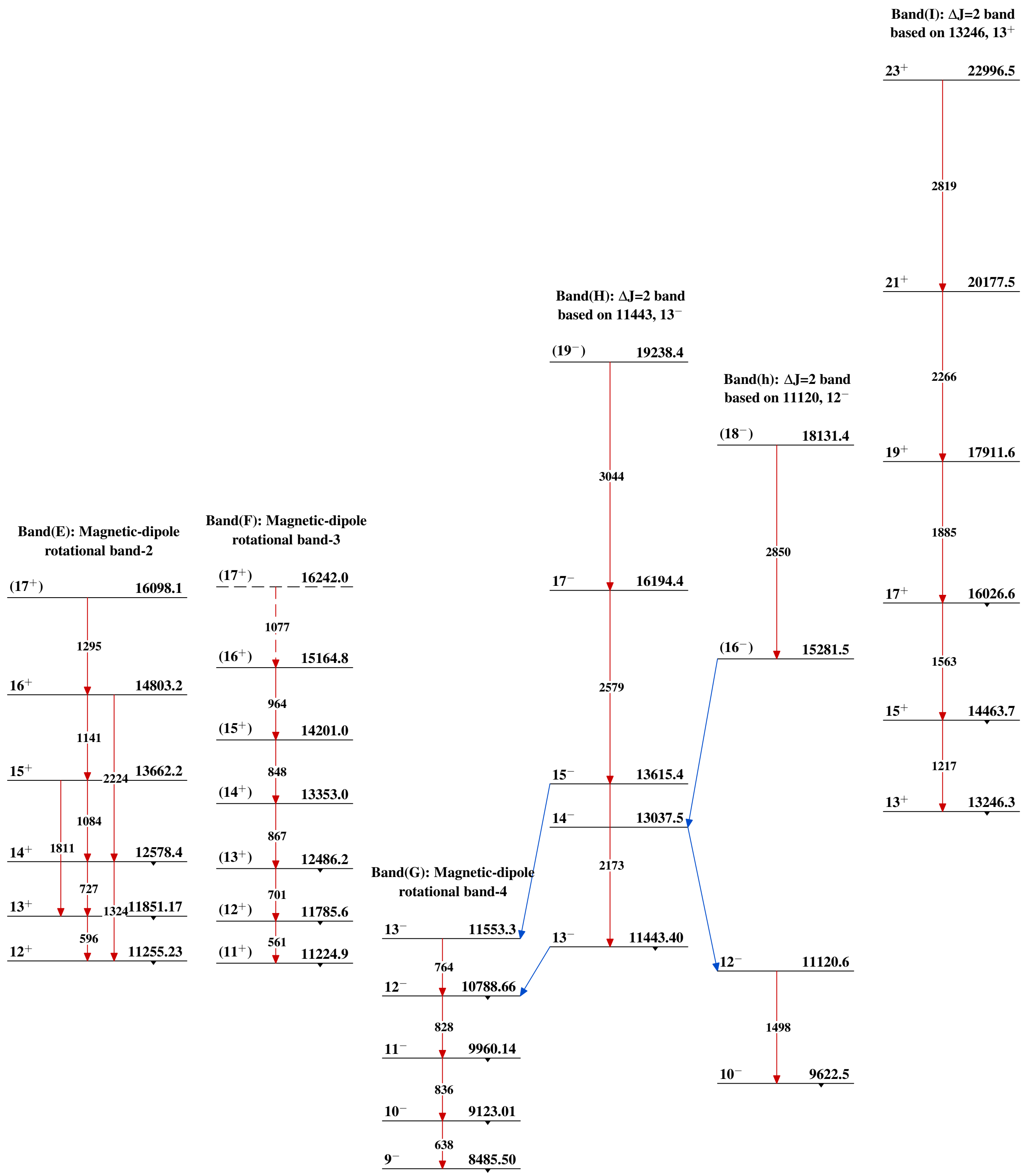
$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas



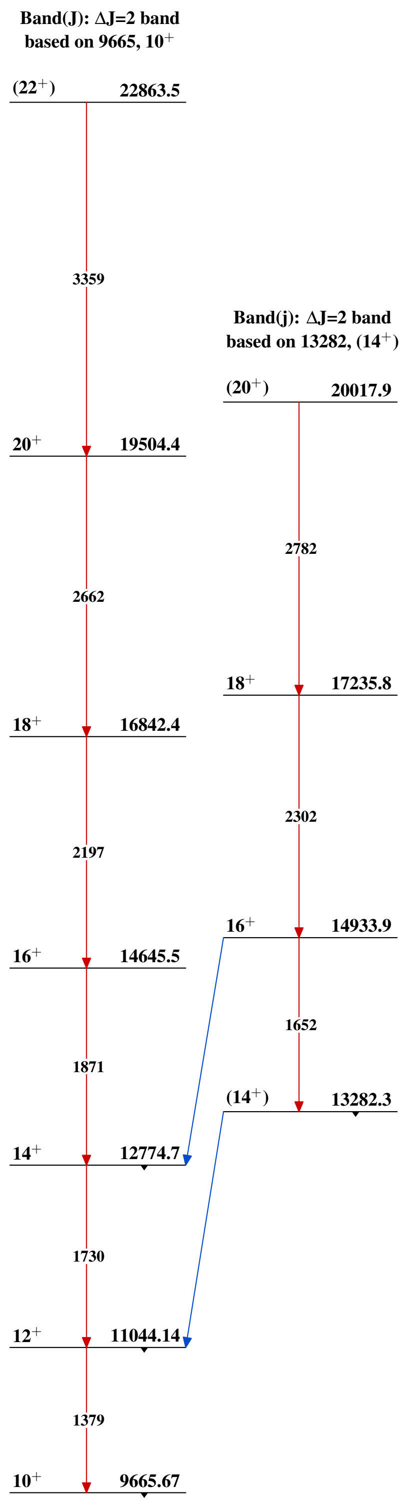
$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas (continued)



$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas (continued)



$^{60}_{28}Ni_{32}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Alan L. Nichols, Balraj Singh, Jagdish K. Tuli	NDS 113,973 (2012)	15-Apr-2012

Q(β^-)=−3958.9 *5*; S(n)=10595.9 *4*; S(p)=11137.2 *8*; Q(α)=−7016.3 *5* 2012Wa38
Note: Current evaluation has used the following Q record −3958.90 4810595.8 *3* 11137.2 *7* −7016.3 *4* 2011AuZZ.
S(2n)=18415.95 *31*, S(2p)=19910.9 *34* (2011AuZZ).
Values in 2003Au03: Q(β^-)=−3948 *4*, S(n)=10596.5 *3*, S(p)=11136.6 *7*, Q(α)=7017.6 *6*, S(2n)=18416.7 *3*, S(2p)=19912 *3*.
2001Tr23: measured level widths and shifts in anti-protonic atoms.
2006An27: nuclear structure calculations of first 2^+ and 3^- states.
Other Reactions:
^{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.
XREF table: the following levels are populated in reactions labeled with XREF=Y:
^{58}Fe(^{16}O,^{12}C): 0, 1173, 2340, 2890, 3270, 3520, 3750.
^{62}Ni(^{3}He,^{3}He′),(^{3}He,dp): 0, 1173, 2300, 2340, 3750, 4350.
^{63}Cu(n,npγ): 0, 1173, 2302, 2336, 3059.
^{63}Cu(^{6}Li,^{7}Be),(^{9}Be,^{10}B): 0, 1173.
^{64}Zn(^{14}C,^{16}O): 0, 1173.
^{66}Zn(α,2α): 0, 1173, 2360.
^{62}Ni isotope identified in mass spectroscopic data by F.W. Aston, Nature 134, 178 (1934).

^{62}Ni Levels

$T_{1/2}$(first 2^+ level at 1173 keV):
τ=2.09 ps *6* is weighted average of 13 values from different methods listed as comments below. A minimum uncertainty of 5% was assigned, and three methods were employed in the weighted averaging procedures. A value consistent with all the three methods has been adopted (LWM: limitation of statistical weights; NRM: normalized residuals method; RT: Rajeval technique). Reduced χ^2 varies between 1.1 and 2.2 in the three methods. 2001Ra27 evaluation adopted a very similar value of τ=2.07 ps *6* which did not include the 2001Ke08 measurement. Other: $T_{1/2}$=1.24 ps *+60−33* (2011Ch05) in (n,n′γ).
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. From Γ in (γ,γ'): 2.15 *42* (1981Ca10, also 2.1 ps *5* in 1977Ca14 from the same group as 1981Ca10).
3. From B(E2) in (e,e′): 2.096 *27* (1967Du07), 2.99 *20* (1972Li28), 1.82 *18* (1975DeXW).
4. From DSAM in (α,pγ): 1.55 *25* (1978Ke11), 1.6 *+4−6* (1978Oh04).
5. From DSAM in Coulomb excitation: 2.28 *18* (1965Es01), 2.01 *12* (2001Ke08), uncertainty increased 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.

Cross Reference (XREF) Flags

A	^{62}Co β^- decay (1.54 min)	L	^{61}Ni(d,p),(pol d,p)	W	^{64}Ni(p,t)
B	^{62}Co β^- decay (13.86 min)	M	^{62}Ni(γ,γ')	X	^{65}Cu(p,α)
C	^{62}Cu ε decay (9.67 min)	N	^{62}Ni(e,e′)	Y	^{58}Fe(^{16}O,^{12}C)
D	^{48}Ca(^{18}O,4nγ)	O	^{62}Ni(n,n′γ)	Z	^{62}Ni(^{3}He,^{3}He′),(^{3}He,dp)
E	^{58}Fe(^{6}Li,d)	P	^{62}Ni(p,p′),(pol p,p′)	Others:	
F	^{59}Co(α,pγ)	Q	^{62}Ni(p,p′γ)	AA	^{63}Cu(n,npγ)
G	^{60}Ni(t,p),(pol t,p)	R	^{62}Ni(d,d′),(pol d,d′)	AB	^{63}Cu(^{6}Li,^{7}Be),(^{9}Be,^{10}B)
H	^{60}Ni(α,^{2}He)	S	^{62}Ni(α,α')	AC	^{64}Zn(^{14}C,^{16}O)
I	^{60}Ni(^{12}C,^{10}C),(^{14}C,^{12}C)	T	Coulomb excitation	AD	^{66}Zn(α,2α)
J	^{61}Ni(n,γ) E=thermal	U	^{63}Cu(n,d)		
K	^{61}Ni(n,γ),(n,n):resonances	V	^{63}Cu(d,^{3}He),(pol d,^{3}He)		

E(level)[†]	J^π	$T_{1/2}$[&]	XREF	Comments
0.0	0^+	stable	ABCDEFGHIJ LMNOPQRSTUVWXYZ	XREF: Others: AA, AB, AC, AD $(<r^2>)^{1/2}$=3.8406 fm *21* (2004An14 evaluation, and 2008 update available on http://cdfe.sinp.msu.ru). 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.
1172.98 *10*	2^+	1.45 ps *4*	ABCDEFGHIJ LMNOPQRSTUVWXYZ	XREF: Others: AA, AB, AC, AD μ=+0.33 *5* (2001Ke02,2011StZZ) Q=+0.05 *12* (1974Le13,1989Ra17,2011StZZ) B(E2)↑=0.0881 *25* μ: transient-field integral PAC (2001Ke02). Others: μ=+0.68 *14* (1988Sp04), +0.64 *22* (1978Ha13). Q: reorientation in Coul. ex. (1974Le13,1989Ra17). J^π: from E2 Coul. ex. from 0^+ g.s.; L(p,t)=L(t,p)=2. B(E2)↑: from adopted lifetime.
2048.68 *12*	0^+	0.76[a] ps *+76−28*	C EFG J LM OPQRS WX	J^π: L(t,p)=L(p,t)=0. $T_{1/2}$: Other: 1.8 ps *+19−6* (2011Ch05) in (n,n′γ).
2301.84 *13*	2^+	0.58[a] ps *+16−9*	ABC EFG J LMNOPQ S WX Z	XREF: Others: AA, AD J^π: L(p,t)=L(t,p)=2. $T_{1/2}$: Other: 0.67 ps *+20−14* in (n,n′γ).
2336.52 *14*	4^+	0.86[a] ps *+24−13*	B DEFG J L OPQRSTUVWXYZ	XREF: Others: AA, AD J^π: L(p,t)=L(t,p)=4. $T_{1/2}$: other: 0.86 ps *+41−22* in (n,n′γ).
2890.63 *20*	0^+	>3.1[a] ps	C EFG J L OPQR WXY	J^π: L(p,t)=0.
3058.76 *17*	3^+	2.3[a] ps *+14−7*	A F J L OPQ WX	XREF: Others: AA J^π: from (n,n′γ). g.s. transition from this level as seen in (n,γ) is disputed. A_2,A_4 measurements indicate ΔJ=1 for all three γ (2011Ch05). L(p,t)=2 is discrepant.
3157.96 *16*	2^+	0.62 ps *+11−10*	A C EFG J M OPQRS U Wx	$T_{1/2}$: from (n,n′γ). Other: 0.69 ps *+55−28* in (α,pγ). J^π: L(p,t)=L(t,p)=2.
3176.7 *3*	4^+	0.73[a] ps *17*	B D F L OP Wx	J^π: L(p,t)=4.
3257.62 *21*	2^+	0.71[a] ps *17*	A C F J L OPQ Wxy	J^π: L(p,t)=2.
3262 *8*	$(2,4)^+$		E G L PQ xy	J^π: from L(^{6}Li,d)=2+4, L(t,p)=(2+4) for unresolved doublet. Also, L(d,p)=1+3. E(level): may include 3270 level.
3269.97 *20*	$1^+,2^+$[#]	0.125 ps *14*	A C J M O xy	J^π: L(d,p)=1+3 for a level at 3265 *10*. $T_{1/2}$: from (n,n′γ).
3277.69 *23*	4^+	0.195[a] ps *+34−18*	B D FG O RS W y	$T_{1/2}$: other: 0.42 ps *+7−6* in (n,n′γ). J^π: L(p,t)=4 for a level at 3271 *5*; L(α,α′)=4 for a level at 3270; γ decay to 2^+ state is Q.
3369.98 *20*	1^+[#]	0.19[a] ps *9*	A C F J LM OP x	$T_{1/2}$: other: 0.35 ps *+8−6* in (n,n′γ). J^π: earlier suggested as $1^+,2^+$. γγ(θ) measurement suggest 3369γ to be stretched dipole (2011Ch05).
3378 *3*			F x	
3462 *3*	1^+ to 4^+		F L PQ VWx	J^π: L=3, dominant J-transfer is 5/2 in (pol d,p).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[&]	XREF	Comments
3486 *3*			F x	
3518.23 *22*	2^+	0.201[a] ps *38*	A FG J LM OPQRS wxy	J^π: J=2,4 from $\gamma\gamma(\theta)$ in ^{61}Ni(n,γ); γ decays to 0^+ levels; L(t,p)=2; L(p,t)=0+2. L=0 component is most likely for 3524 level. $T_{1/2}$: other: 0.62 ps *+12−10* in (n,n′γ).
3522.54 *18*	$2^+,3^+$[@]	0.15[a] ps *+6−5*	F J O xy	$T_{1/2}$: other: 0.61 ps *+30−17* in (n,n′γ).
3524.4 *5*	0^+	0.7[b] ps *+5−2*	E O wxy	XREF: Others: AA, AC XREF: E(3519). J^π: from (n,n′γ); L(^{6}Li,d)=0; L(p,t)=0+2.
3756.5 *3*	3^-	0.149[a] ps *+34−22*	EFG J L NOPQRS W yZ	B(E3)↑=0.020 *3* (1967Du07,2002Ki06) J^π: L(p,t)=L(t,p)=L(p,p′)=3. $T_{1/2}$: other: 0.17 ps *+8−5* in (n,n′γ). B(E3) from (e,e′) (1967Du07).
3849.4 *3*	$0^+,1^+,2^+$		J M PQ	J^π: from (γ,γ') if γ decay from 7646, 1^- level is E1.
3859.6 *4*	$1^+,2^+$	0.277[a] ps *+17−9*	C FG J LM P R U W	XREF: Others: AC XREF: L(3853). J^π: J=1,2 from γ transitions to 0^+ states, π=+ from log *ft*=5.6 from 1^+; L(d,p)=1; L(p,t)=2 for a doublet.
3967 *3*	+		F L PQ	J^π: L(d,p)=1 for a level at 3965 *10*.
3972.9 *4*	2^+	0.111[a] ps *35*	FG J M W	J^π: L(p,t)=2.
4000.5 *10*	4^+	0.042[a] ps *+28−21*	F P W	J^π: L(p,t)=4.
4011.0 *15*		>0.90[a] ps	F	
4018.88 *25*	$(6)^+$	0.62 ps *28*	D F L OP W	$T_{1/2}$: from DSA and RDM in (^{18}O,4nγ). Other: 0.076 ps *+62−28* in (α,pγ). J^π: E2 γ to 4^+ and intense feeding in (^{18}O,4nγ).
4035 *7*	(0 to 3)$^+$		L PQ	J^π: L(d,p)=1 from $3/2^-$ target.
4055.3 *3*	4^+	0.042[a] ps *+15−10*	B F L P Wx	J^π: L(p,t)=4.
4062.4 *5*	$1^+,2^+$[#]		A FG J M UV x	
4146.0 *8*	(4^+)	0.34[a] ps *+21−11*	F HI l PQ UVw	XREF: Others: AB, AD XREF: I(4200). J^π: L(p,t)=(4) for a doublet at 4154 *6*; L(d,p)=3 for a 4153 *10* level.
4151.4 *3*	$2^+,3^+$[@]	0.034[a] ps *9*	F J l P w	
4154.2 *4*	(4^+)		FG l w	J^π: L(p,t)=(4) for a doublet at 4154 *6*; L(d,p)=3 for a 4153 *10* level.
4161.26 *24*	(5^-)	<1.4 ps	D F S	J^π: L(α,α')=5 for a level at 4150. J=(5) from (^{18}O,4nγ).
4179 *3*			F P R	
4201.0 *4*	$(3,4)^-$		J L P	J^π: 3^- to 6^- from L=4, dominant J-transfer 9/2 in (pol d,p); γ decay to $2^+,3^+$ state excludes 6.
4208.8 *21*			J	
4230.0 *10*	0^+		J M P R W	J^π: L(p,t)=0.
4317.2 *11*	$1^+,2^+$[#]		G J P W Z	
4393 *7*	(1 to 5)$^+$		L PQ	J^π: L(d,p)=3 from $3/2^-$ target.
4407 *4*	2^+		P W	J^π: L(p,t)=2.
4415.9 *5*	$1^+,2^+$[#]		G J	
4424 *3*			F	
4437 *4*	(3^-)		PQ S W	J^π: L(α,α')=(3).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	J^{π}	$T_{1/2}$[&]	XREF	Comments
4455 *4*			G L P W	
4503 *4*	$(3)^-$		G L PQ W	J^{π}: L(p,t)=(3); L(pol d,p)=4 from $3/2^-$ target for a 4500 *25* level.
4623 *5*	0^+		G PQ W	J^{π}: L(p,t)=L(t,p)=0.
4627.5 *10*	$2^+,3^+$[@]		J	
4648.9 *3*	(7^-)[‡]	509 ps *24*	D F HI Q S	J^{π}: D+Q γ to (6^+) and E2 γ to (5), (^{18}O,4nγ).
4655 *5*	3^-		G P W	J^{π}: L(p,t)=3.
4704 *7*			PQ x	
4712 *5*	2^+		G L P Wx	J^{π}: L(p,t)=2.
4719.9 *7*	$(3)^-$		J L Wx	J^{π}: L=4, dominant J-transfer is 9/2 for a level at 4720 *25*, ^{61}Ni(pol d,p); γ to 2^+.
4781 *5*	2^+		G PQ S U W	J^{π}: L(p,t)=2.
4835 *7*			P	
4847 *7*	(1 to $5)^{(+)}$		PQ V	J^{π}: L(d,^{3}He)=3 from $3/2^-$ target for a 4850 *80* group.
4861 *5*	(2^+)		D x	J^{π}: L(p,t)=(2).
4863.3 *3*	$5^-,6^-$	8.39 ps *14*	G L PQ Wx	J^{π}: L=4, dominant J-transfer of $9/2^+$ in (pol d,p) gives 3^- to 6^-. Lifetime and strong feeding in (^{18}O,4nγ) exclude 3 and 4.
4882 *5*	4^+		L P Wx	J^{π}: L(p,t)=4.
4949 *7*			P	
4967 *7*			P	
4981 *7*	(4^+)		GH P	J^{π}: from DWBA analysis and proposed configuration=$\nu p_{3/2}\otimes\nu f_{5/2}$ in (α,^{2}He).
4994 *6*	3^-		P W	J^{π}: L(p,t)=3.
4999.7 *14*	$1^+,2^+$[#]		G J Q	
5016 *5*	4^+		G L P W	J^{π}: L(p,t)=4.
5041 *10*	$(3^-$ to $6^-)$		P	J^{π}: L=4, dominant J-transfer is 9/2 in (pol d,p) for a level at 5030 *25*.
5071 *10*			L PQ	
5121 *10*			PQ	
5148 *5*	(2^+)		P W	J^{π}: L(p,t)=(2).
5154 *10*	$(2^+,4^+)$		G P	J^{π}: L(t,p)=(2+4).
5203 *5*	2^+		P W	J^{π}: L(p,t)=2.
5222 *10*			PQ	
5233 *10*			P	
5280 *10*			PQ	
5286 *6*	(2^+)		G P W	J^{π}: L(p,t)=(2).
5310	2^+		S	J^{π}: L(α,α')=2.
5331 *10*	$(3)^-$		G i L PQ	J^{π}: J=(3) from L(t,p)=(3); π=− from L(d,p)=2. Also L=2, dominant J-transfer is 5/2 in (pol d,p).
5355 *5*	4^+		i P W	J^{π}: L(p,t)=4.
5393 *10*			P	
5420 *5*	(4^+)		G PQ W	J^{π}: L(p,t)=(4).
5447 *5*	0^+		G P W	J^{π}: L(p,t)=0.
5465 *6*			P W	
5488 *10*			P	
5511 *10*			L P	
5.53×10^3 *10*	6^+		N	J^{π}: from form factor in ^{62}Ni(e,e′).
5541 *5*	2^+		G P VW	J^{π}: L(p,t)=2.
5545 *10*	3^- to 6^-		L P	J^{π}: L=4, dominant J-transfer is 9/2 in (pol d,p) for a level at 5540 *25*.
5565 *10*			P	
5574 *5*	2^+		G P W	J^{π}: L(p,t)=2.

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)†	J^π	$T_{1/2}$&	XREF	Comments
5587 *10*			P	
5601 *10*			P	
5628 *6*	3^-		G L P S W	J^π: L(t,p)=3; L(α,α')=3 for a level at 5640 *10*.
5673 *10*	5^-		HI P	
5679 *8*			G P W	
5709 *10*			P	
5739 *10*			P	
5751.2 *3*	(9^-)‡	0.55 ps *21*	D	J^π: E2 γ to (7), 4648 level, (^{18}O,4nγ).
5772 *10*			P	
5806.1 *4*	(7,8,9)	<1.4 ps	D	J^π: from lifetime and strong feeding, (^{18}O,4nγ).
5808 *6*	(3^-)		P W	J^π: L(p,t)=(3).
5834 *10*	$^-$		L P	J^π: L(pol d,p)=2 for a level at 5830 *25*.
5846 *10*			P	
5859 *10*			L P	
5870 *10*			P	
5888 *8*	(4^+)		P W	J^π: L(p,t)=(4).
5901 *10*			P	
5912 *8*	4^+		P W	J^π: L(p,t)=4.
5930	2^+		S	J^π: L(α,α')=2.
5961 *10*			P	
5979 *10*			P	
5993 *10*	$(1^-,2^-)$		P V	J^π: L(d,^{3}He)=0 from $3/2^-$ target for a group at 5990 *80*.
6023 *10*			P	
6026 *10*			P	
6047 *8*	(3^-)		P W	J^π: L(p,t)=(3).
6059 *10*	7^-		HI P	E(level),J^π: doublet in (α,^{2}He) with J^π=5^- and 7^-.
6073 *8*			P W	
6103 *10*	1^- to 4^-		L P	J^π: L=2, dominant J-transfer is 5/2 in (pol d,p) for a level at 6100 *25*.
6126 *8*			P W	E(level): assumed to be same as 6121 *10* level seen in (p,p′).
6133 *10*			P	
6143 *10*			P	
6160 *9*			W	
6170 *10*			P	E(level): same as 6160 level?
6253 *9*	(4^+)		W	J^π: L(p,t)=(4).
6313 *9*	1^- to 4^-		L Q W	J^π: L=2, dominant J-transfer is 5/2 in (pol d,p) for a level at 6320 *25*.
6354 *8*	2^+		W	J^π: L(p,t)=2.
6398 *8*	4^+		L W	J^π: L(p,t)=4.
6454 *8*			W	
6520	3^-		P S	J^π: L(p,p′)=L(α,α')=3.
6540 *80*	$1^-,2^-$		L V	J^π: L(d,^{3}He)=0 from $3/2^-$ target.
6647.0 *3*	(9^-)‡		D	J^π: E2 γ from 7559 level, J=(11); γ to (7^-) level, (^{18}O,4nγ).
6680			P	
6750 *80*	$1^-,2^-$		L V	J^π: L(d,^{3}He)=L(d,p)=0 from $3/2^-$ targets.
6900 *25*	$(1^-,2^-)$		L	J^π: L(pol d,p)=(0).
7030	3^-		P	J^π: L(p,p′)=3.
7080 *30*			L	E(level): seen in (d,p), perhaps same as 7030.
7170	8^+		HI Q	E(level),J^π: doublet at 7190 in (α,^{2}He) with J^π=6^+ and 8^+.
7260	1^- to 4^-		L P	J^π: L=2, dominant J-transfer is 5/2 in (pol d,p) for a level at 7300 *25*.
7559.4 *4*	(11^-)‡	0.83 ps *42*	D	J^π: E2 γ transitions to J=(9^-) levels, (^{18}O,4nγ).

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	J^π	XREF	Comments
7620	6^+	HI PQ	
7645.6 *4*	1^-	M	E(level): differs from Eγ of capture γ from Fe(n,γ) by 14.35 eV *15*. J^π: E1 γ to g.s., ^{62}Ni(γ,γ′).
7700?		Q	
7800 *25*	1^- to 4^-	L	J^π: L=2, dominant J-transfer is 5/2 in (pol d,p).
8130 *25*	(1^- to 4^-)	L Q	J^π: L=(2), dominant J-transfer is (5/2) in (pol d,p).
8460 *25*	(2^- to 5^-)	L	J^π: L=(4), dominant J-transfer is (7/2) in (pol d,p).
(10596.1 *4*)	$1^-,2^-$	J	
10597.1[c] *3*	1^-[c]	K	
10598.9[c] *3*	1^+[c]	K	
10599.0[c] *3*	2^-[c]	K	
10602.0[c] *3*	1^+[c]	K	
10602.2[c] *3*	1^+[c]	K	
10602.8[c] *3*	1^-[c]	K	
10603.2[c] *3*	2^-[c]	K	
10604.1[c] *3*	2^-[c]	K	
10605.7[c] *3*	1^+[c]	K	
10608.2[c] *3*	2^-[c]	K	
10608.9[c] *3*	1^+[c]	K	
10609.2[c] *3*	2^-[c]	K	
10609.5[c] *3*	2^+[c]	K	
10609.9[c] *3*	1^+[c]	K	
10612.1[c] *3*	1^-[c]	K	
10613.3[c] *3*	1^-[c]	K	
10614.3[c] *3*	2^-[c]	K	
10616.8[c] *3*	2^-[c]	K	
10616.9[c] *3*	1^+[c]	K	
10619.9[c] *3*	1^-[c]	K	
10623.5[c] *3*	2^-[c]	K	
10624.3[c] *3*	1^-[c]	K	
10624.4[c] *3*	2^-[c]	K	
10625.8[c] *3*	2^-[c]	K	
10626.3[c] *3*	1^-[c]	K	
10627.0[c] *3*	2^-[c]	K	
10627.9[c] *3*	2^-[c]	K	
10628.8[c] *3*	1^-[c]	K	
10629.8[c] *3*	1^+[c]	K	
10632.2[c] *3*	1^-[c]	K	
10632.2[c] *3*	2^-[c]	K	
10632.5[c] *3*	1^+[c]	K	
10636.4[c] *3*	1^-[c]	K	
10638.6[c] *3*	2^-[c]	K	
10640.4[c] *3*	1^-[c]	K	
10640.4[c] *3*	2^+[c]	K	
10641.1[c] *3*	1^-[c]	K	
10641.6[c] *3*	1^-[c]	K	
10645.3[c] *3*	2^-[c]	K	
10645.6[c] *3*	2^-[c]	K	
10646.2[c] *3*	1^+[c]	K	
10646.4[c] *3*	1^+[c]	K	
10647.3[c] *3*	1^+[c]	K	

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	J^π	XREF
10648.1[c] 3	2^-[c]	K
10649.6[c] 3	1^-[c]	K
10651.3[c] 3	2^-[c]	K
10652.8[c] 3	2^-[c]	K
10653.0[c] 3	2^-[c]	K
10654.1[c] 3	1^+[c]	K
10655.5[c] 3	2^-[c]	K
10655.6[c] 3	2^-[c]	K
10658.0[c] 3	1^+[c]	K
10658.4[c] 3	1^+[c]	K
10658.7[c] 3	2^-[c]	K
10660.4[c] 3	2^-[c]	K
10663.0[c] 3	2^-[c]	K
10664.3[c] 3	2^-[c]	K
10664.3[c] 3	1^-[c]	K
10665.3[c] 3	1^+[c]	K
10667.5[c] 3	2^-[c]	K
10671.8[c] 3	2^-[c]	K
10671.8[c] 3	1^-[c]	K
10673.4[c] 3	1^+[c]	K
10673.5[c] 3	2^-[c]	K
10674.9[c] 3	2^-[c]	K
10677.3[c] 3	1^-[c]	K
10677.6[c] 3	1^-[c]	K
10678.4[c] 3	2^-[c]	K
10681.1[c] 3	1^+[c]	K
10682.8[c] 3	1^-[c]	K
10688.3[c] 3	2^-[c]	K
10690.6[c] 3	1^-[c]	K
10690.9[c] 3	2^+[c]	K
10691.2[c] 3	1^+[c]	K
10692.2[c] 3	1^-[c]	K
10692.5[c] 3	2^-[c]	K
10695.7[c] 3	2^-[c]	K
10698.7[c] 3	1^-[c]	K
10699.2[c] 3	2^-[c]	K
10700.0[c] 3	1^-[c]	K
10702.2[c] 3	2^-[c]	K
10703.3[c] 3	1^+[c]	K
10703.5[c] 3	2^-[c]	K
10704.0[c] 3	1^+[c]	K
10704.7[c] 3	1^+[c]	K
10706.2[c] 3	2^-[c]	K
10708.4[c] 3	2^-[c]	K
10711.2[c] 3	2^-[c]	K
10712.1[c] 3	1^-[c]	K
10712.8[c] 3	2^-[c]	K
10714.3[c] 3	2^-[c]	K
10715.0[c] 3	2^-[c]	K
10716.6[c] 3	2^-[c]	K
10719.2[c] 3	2^-[c]	K
10720.7[c] 3	2^-[c]	K
10721.1[c] 3	1^-[c]	K
10721.8[c] 3	2^-[c]	K
10723.8[c] 3	1^-[c]	K
10724.4[c] 3	1^-[c]	K
10724.8[c] 3	2^-[c]	K
10729.7[c] 3	2^-[c]	K
10730.7[c] 3	2^-[c]	K
10731.7[c] 3	2^-[c]	K
10734.2[c] 3	2^-[c]	K
10735.4[c] 3	1^-[c]	K
10736.1[c] 3	2^-[c]	K
10736.8[c] 3	2^-[c]	K
10738.6[c] 3	2^-[c]	K
10740.7[c] 3	1^+[c]	K
10741.2[c] 3	2^-[c]	K
10742.7[c] 3	2^-[c]	K
10746.3[c] 3	2^-[c]	K
10747.1[c] 3	1^-[c]	K
10748.0[c] 3	2^-[c]	K
10748.5[c] 3	2^-[c]	K
10749.7[c] 3	1^-[c]	K
10752.3[c] 3	1^-[c]	K
10753.1[c] 3	2^-[c]	K
10754.9[c] 3	2^-[c]	K
10757.8[c] 3	1^-[c]	K
10759.7[c] 3	1^-[c]	K
10760.6[c] 3	2^-[c]	K
10763.7[c] 3	2^-[c]	K
10766.1[c] 3	2^-[c]	K
10767.0[c] 3	1^-[c]	K
10769.8[c] 3	1^-[c]	K
10772.4[c] 3	2^-[c]	K
10774.7[c] 3	2^-[c]	K
10776.5[c] 3	2^-[c]	K
10778.3[c] 3	1^-[c]	K
10781.5[c] 3	2^-[c]	K
10786.5[c] 3	1^-[c]	K
10787.8[c] 3	2^-[c]	K
10790.9[c] 3	2^-[c]	K
10793.3[c] 3	1^-[c]	K
10796.0[c] 3	2^-[c]	K
10798.5[c] 3	1^+[c]	K
10799.1[c] 3	1^-[c]	K
10800.6[c] 3	1^+[c]	K
10802.2[c] 3	3^+[c]	K
10803.0[c] 3	2^-[c]	K
10804.6[c] 3	3^+[c]	K
10805.9[c] 3	1^+[c]	K
10807.1[c] 3	2^-[c]	K
10810.3[c] 3	2^-[c]	K

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Adopted Levels, Gammas (continued)

^{62}Ni Levels (continued)

E(level)[†]	J^π	XREF
10812.4[c] 3	2^{-}[c]	K
10817.1[c] 3	2^{-}[c]	K
10819.2[c] 3	2^{-}[c]	K
10822.7[c] 3	2^{-}[c]	K
10824.3[c] 4	2^{-}[c]	K
10824.4[c] 5	1^{-}[c]	K
10827.8[c] 3	2^{-}[c]	K
10828.5[c] 3	1^{-}[c]	K
10832.2[c] 3	2^{-}[c]	K
10832.3[c] 5	1^{-}[c]	K
10845.6[c] 3	2^{-}[c]	K
10849.8[c] 3	1^{-}[c]	K
10851.4[c] 3	2^{-}[c]	K
10855.3[c] 3	2^{-}[c]	K
10858.7[c] 3	2^{-}[c]	K
10868.7[c] 3	2^{-}[c]	K
10876.1[c] 3	2^{-}[c]	K
10878.9[c] 3	2^{-}[c]	K
10882.5[c] 3	2^{-}[c]	K
10884.4[c] 3	2^{-}[c]	K
10885.7[c] 3	2^{-}[c]	K
10888.2[c] 3	2^{-}[c]	K
10891.2[c] 3	2^{-}[c]	K
10970[c] 20	2^{-}[c]	K
11010[c] 20	1^{-}[c]	K

† Level energies given with decimals are from a least-squares fit to the adopted Eγ data. Others are from ^{64}Ni(p,t) and ^{62}Ni(p,p′), and from ^{61}Ni(d,p) at the highest energies.

‡ Parity same as that of 4160 level, from ^{48}Ca(^{18}O,4nγ).

From ^{61}Ni(n,γ): $J^\pi=0^+$ to 3^+ from primary E1 transition from $1^-,2^-$ capturing state, γ to 0^+ excludes 0 and 3.

@ From ^{61}Ni(n,γ): $J^\pi=0^+$ to 3^+ from primary E1 transition from $1^-,2^-$ capturing state, γ to 4^+ excludes 0 and 1.

& From ^{48}Ca(^{18}O,4nγ), except as noted.

a From DSAM in ^{59}Co(α,pγ).

b From DSAM in ^{62}Ni(n,n′γ).

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

Adopted Levels, Gammas (continued)

$\gamma(^{62}Ni)$

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ[@]	Comments
1172.98	2^+	1172.95 11	100	0.0	0^+	E2[&]		B(E2)(W.u.)=12.1 4
2048.68	0^+	875.69 7	100	1172.98	2^+	E2[&]		
		(2048.4)		0.0	0^+	E0		q^2_K(E0/E2)=0.084 11, X(E0/E2)=0.031 4 (2005Ki02). E_γ: a 2048.4-keV E0 transition has been observed (1981Pa10) with B(E0 to g.s.)/B(E2 to 1173)=0.028 5 from ce(K)(2048γ)/ce(K)(876γ)=0.084 11.
2301.84	2^+	1128.82 14	80.8 20	1172.98	2^+	M1+E2	+3.19 11	B(M1)(W.u.)=0.00106 +18−30; B(E2)(W.u.)=14.9 +24−42 Mult.,δ: from ^{62}Ni(p,p′γ) (1972Va01). Other: δ=+3.0 +7−20 from ^{62}Cu decay (1976Ca31).
		2301.8 3	100 3	0.0	0^+	E2		B(E2)(W.u.)=0.57 +10−16
2336.52	4^+	1163.50 12	100	1172.98	2^+	E2[&]		B(E2)(W.u.)=21 +4−6
2890.63	0^+	1717.5 3	100	1172.98	2^+	E2		B(E2)(W.u.)<0.84 Mult.: δ=−4.1 +13−30 from (n,γ) (1970Fa06). Known J^π requires pure E2.
3058.76	3^+	722.02 23	47 4	2336.52	4^+	M1+E2	+1.6 +3−9	
		756.85 20	100 6	2301.84	2^+	(M1+E2)	−0.08 2	B(M1)(W.u.)=(0.009 +3−6); B(E2)(W.u.)=(0.18 +11−15)
		1885.8 3	91 7	1172.98	2^+	M1(+E2)	−0.03 +3−2	B(M1)(W.u.)=(0.00055 +18−34) δ: from (n,n′γ). Others: −0.50 8 (1985KoZM in (n,n′γ), +0.65 +20−16 (1970Fa06).
3157.96	2^+	856.09 12	12.3 5	2301.84	2^+	M1+E2		
		1984.9 3	100 4	1172.98	2^+	(M1+E2)	+0.13 8	B(M1)(W.u.)=(0.0026 5); B(E2)(W.u.)=(0.020 +25−20) δ: from (n,n′γ) (1970Fa06).
		3158.0 15	58 7	0.0	0^+	E2		B(E2)(W.u.)=0.068 +14−15
3176.7	4^+	875.0 4	6.9 10	2301.84	2^+	[E2]		
		2003.6 4	100 4	1172.98	2^+	E2[c]		B(E2)(W.u.)=1.5 4
3257.62	2^+	955.7 3	3.76 22	2301.84	2^+	[E2+M1]		
		2084.8 4	100 3	1172.98	2^+	M1+E2		
		3257.6 12	3.3 4	0.0	0^+	E2		B(E2)(W.u.)=0.0046 13
3269.97	$1^+,2^+$	968.2 5	>11.6	2301.84	2^+			
		1221.0 3	<97.7	2048.68	0^+			
		2097.2 3	100	1172.98	2^+			
		3270.0 22	<23.3	0.0	0^+			
3277.69	4^+	2104.5 3	100	1172.98	2^+	E2[&]		B(E2)(W.u.)=4.8 +5−9 E_γ: average of 2103.78 25 (^{18}O,4nγ) and 2104.6 3 (^{62}Co β^- decay (13.9-min)), 2104.5 3 in (α,pγ). B(E2)(W.u.)>0.55.
3369.98	1^+	479.36 6	2.8 5	2890.63	0^+			
		1067.7 3	16.6 17	2301.84	2^+	M1+E2	+1.6 +41−11	B(M1)(W.u.)=0.003 +13−3; B(E2)(W.u.)=13 +21−13 δ: from (n,n′γ) (2011Ch05).
		1321.1 3	12.8 13	2048.68	0^+			
		3369.7 17	100 16	0.0	0^+	D		
3378		2205 3	100	1172.98	2^+			

$^{62}_{28}Ni_{34}$-9

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

E_i(level)	J_i^π	E_γ [‡]	I_γ [#]	E_f	J_f^π	Mult. [@]	δ [@]	α [†]	Comments
3462	1^+ to 4^+	2289 *3*	100	1172.98	2^+				
3486		1184 *3*	100	2301.84	2^+				
3518.23	2^+	360.5 *4*	2.6 *3*	3157.96	2^+				
		459.3 *3*	10.0 *5*	3058.76	3^+				
		1469.9 *5*	13.3 *5*	2048.68	0^+	E2			B(E2)(W.u.)=2.8 *6*
		2345.3 *4*	100 *5*	1172.98	2^+	(M1+E2)[b]	+0.32 *6*		δ: from (n,n′γ) (2011Ch05). Other: +0.44 *9* (from (n,γ), 1970Fa06).
		3519.0 *21*	9.9 *15*	0.0	0^+	E2			B(E2)(W.u.)=0.026 *7*
3522.54	$2^+,3^+$	264.94 *25*	2.0 *4*	3257.62	2^+				I_γ: from (n,γ).
		463.3 *5*	29 *4*	3058.76	3^+				I_γ: from (n,γ).
		1185.94 *18*	49 *8*	2336.52	4^+				I_γ: from (n,γ).
		1221.0 *3*	<100	2301.84	2^+				
3524.4	0^+	2351.4 *4*	100	1172.98	2^+				
3756.5	3^-	1454.5 *3*	92 *8*	2301.84	2^+	[E1]			B(E1)(W.u.)=0.00045 *+9−12*
		2584.1 *5*	100 *8*	1172.98	2^+	(E1)			B(E1)(W.u.)=8.7×10^{-5} *+16−22*
3849.4	$0^+,1^+,2^+$	579.42 *20*	100 *11*	3269.97	$1^+,2^+$				
		1548.0 *5*	91 *4*	2301.84	2^+				
3859.6	$1^+,2^+$	968.2 *4*	33 *9*	2890.63	0^+	[E2]			
		3861.7 *11*	100 *13*	0.0	0^+	[E2]			
3967	+	1665 *3*	100	2301.84	2^+				E_γ: seen in (α,pγ), coincident with 2302γ.
3972.9	2^+	450.4 *7*	2 *1*	3522.54	$2^+,3^+$				
		703.1 *6*	11 *4*	3269.97	$1^+,2^+$				
		2799.4 *5*	100 *39*	1172.98	2^+				E_γ: 2805.2 *18* in (α,pγ).
		3973 *2*	97 *30*	0.0	0^+	[E2]		0.001179 *17*	B(E2)(W.u.)=0.16 *9* α(K)=1.643×10^{-5} *23*; α(L)=1.586×10^{-6} *23*; α(M)=2.23×10^{-7} *4* α(N)=9.73×10^{-9} *14*; α(IPF)=0.001161 *17* I_γ: average of 67 *11* in (n,γ) and 127 *32* in (α,pγ).
4000.5	4^+	1664	100	2336.52	4^+				
4011.0		2837.9 *15*	100	1172.98	2^+				
4018.88	$(6)^+$	1682.34 *21*	100	2336.52	4^+	E2[&]			B(E2)(W.u.)=4.6 *21*
4055.3	4^+	777.5 *3*	26 *3*	3277.69	4^+				
		1718.8 *5*	100 *6*	2336.52	4^+				
		1753.5 *8*	9 *3*	2301.84	2^+	[E2]			B(E2)(W.u.)=3.3 *+14−17*
		2882.3 *4*	16 *1*	1172.98	2^+	[E2]			B(E2)(W.u.)=0.49 *+13−18*
4062.4	$1^+,2^+$	1761.0 *5*	100 *20*	2301.84	2^+				
		4062.4 *10*	90 *10*	0.0	0^+				
4146.0	(4^+)	870[d]		3277.69	4^+				
		1844.1 *8*	100	2301.84	2^+	[E2]			B(E2)(W.u.)=5.4 *+18−33*
4151.4	$2^+,3^+$	1092.50 *25*	100 *22*	3058.76	3^+				

$^{62}_{28}Ni_{34}$-10

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

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	α[†]	Comments
4151.4	$2^+,3^+$	1815.8 *8*	44 *22*	2336.52	4^+			
		1850.0 *7*	66 *22*	2301.84	2^+			
4154.2	(4^+)	1817.7 *3*	100	2336.52	4^+			E_γ: evaluator assumes that 1815.8γ in (n,γ) and 1817.7γ in (α,pγ) are not the same.
4161.26	(5^-)	883.54 *16*	50 *21*	3277.69	4^+	D+Q[a]		I_γ: average of 29 in (^{18}O,4nγ) and 71 in (α,pγ). δ: −0.24 *6* or −2.4 *4*, (^{18}O,4nγ). $\Delta\pi$=yes suggests smaller value more likely. 5^- assignment defines the transition as E1+M2; δ=−0.24 *6* gives B(M2)(W.u.)>20, compared with RUL=1.
		1001	38	3157.96	2^+			Mult.: assignment of 5^- defines the transition as E3 to give B(E3)(W.u.)>7.6×10^5, compared with RUL=100; this transition may be suspect.
		1825.0 *3*	100	2336.52	4^+	D+Q[a]		δ: −0.16 *6* or −3.1 *4*, (^{18}O,4nγ) $\Delta\pi$=yes suggests smaller solution more likely.
4179		1002 *3*	100	3176.7	4^+			
4201.0	$(3,4)^-$	678.5 *3*	100	3522.54	$2^+,3^+$			
4317.2	$1^+,2^+$	4318 *3*	100	0.0	0^+			
4415.9	$1^+,2^+$	1045.9 *4*	100 *20*	3369.98	1^+			
		4416 *2*	80 *20*	0.0	0^+			
4424		2122 *3*	100	2301.84	2^+			
4627.5	$2^+,3^+$	310.4 *5*	26 *11*	4317.2	$1^+,2^+$			
		2289.7 *15*	80 *43*	2336.52	4^+			
		3456 *3*	100 *29*	1172.98	2^+			
4648.9	(7^-)	487.59 *13*	52	4161.26	(5^-)	E2[&]	0.00179 *3*	B(E2)(W.u.)=0.95 *5* α(K)=0.001609 *23*; α(L)=0.0001603 *23*; α(M)=2.25×10^{-5} *4*; α(N)=9.42×10^{-7} *14*
		630.0 *14*	100	4018.88	$(6)^+$	D+Q[a]		E_γ: 628.4 *3* from (α,pγ) not included in average. δ: −0.19 *4* or −2.3 *5*, (^{18}O,4nγ).
4719.9	$(3)^-$	1661.3 *7*	100 *50*	3058.76	3^+			
		3546 *2*	88 *25*	1172.98	2^+			
4863.3	$5^-,6^-$	702.02 *14*	100	4179				
4999.7	$1^+,2^+$	3828 *2*	100 *18*	1172.98	2^+			
		4998 *2*	82 *18*	0.0	0^+			
5751.2	(9^-)	1102.41 *17*	100	4648.9	(7^-)	E2[&]		B(E2)(W.u.)=43 *17*
5806.1	(7,8,9)	1157.24 *22*	100	4648.9	(7^-)			
6647.0	(9^-)	895.75 *16*	100	5751.2	(9^-)			
		1997.94 *24*	88	4648.9	(7^-)			
7559.4	(11^-)	912.33 *16*	46	6647.0	(9^-)	E2[&]		B(E2)(W.u.)=23 *12*
		1808.43 *22*	100	5751.2	(9^-)	E2[&]		B(E2)(W.u.)=1.7 *9*
7645.6	1^-	3416	1.9	4230.0	0^+			
		3585	3.3	4062.4	$1^+,2^+$			
		3671	4.9	3972.9	2^+			

$^{62}_{28}$Ni$_{34}$-11

Adopted Levels, Gammas (continued)

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

E_i(level)	J_i^π	E_γ ‡	I_γ #	E_f	J_f^π	Mult. @	Comments
7645.6	1^-	3783	3.3	3859.6	$1^+,2^+$		
		3798	0.6	3849.4	$0^+,1^+,2^+$		
		4129	2.4	3518.23	2^+		
		4273	3.3	3369.98	1^+		
		4375	3.4	3269.97	$1^+,2^+$		
		4487	2.7	3157.96	2^+		
		5597	25.8	2048.68	0^+		
		6473	6.5	1172.98	2^+		
		7646	100	0.0	0^+	E1	B(E1)(W.u.)=6.5×10^{-5} α(IPF)=0.00264 *4* Mult.: from polarization measurement, $^{62}Ni(\gamma,\gamma')$.
(10596.1)	$1^-,2^-$	5596 *4*	3.0 *20*	4999.7	$1^+,2^+$		
		5877 *2*	6.0 *20*	4719.9	$(3)^-$		
		5968 *2*	14.0 *20*	4627.5	$2^+,3^+$		
		6179 *2*	20 *4*	4415.9	$1^+,2^+$		
		6277 *3*	8 *4*	4317.2	$1^+,2^+$		
		6364 *2*	10 *6*	4230.0	0^+		
		6387 *2*	8 *4*	4208.8			
		6395 *2*	10 *6*	4201.0	$(3,4)^-$		
		6445 *2*	24 *4*	4151.4	$2^+,3^+$		
		6623 *2*	34 *6*	3972.9	2^+		
		6840.0 *15*		3756.5	3^-		
		7073 *3*	30 *14*	3522.54	$2^+,3^+$		
		7078.0 *15*	72 *14*	3518.23	2^+		
		7326.0 *15*	96 *8*	3269.97	$1^+,2^+$		
		7338 *2*	28 *6*	3257.62	2^+		
		7436 *2*	40 *6*	3157.96	2^+		
		7537 *2*		3058.76	3^+		
		7703.4 *15*	26 *12*	2890.63	0^+		
		8296 *3*	16 *4*	2301.84	2^+		
		8551.3 *15*	92 *10*	2048.68	0^+		
		9422.3 *5*	100 *10*	1172.98	2^+		
		10594.6 *7*	74 *16*	0.0	0^+		

† Additional information 1.
‡ From (n,n′γ) for E(level) up to 3756.4; for others Eγ are averages from the most precise measurements. The most complete data from $^{61}Ni(n,\gamma)$ tend to have Eγ that are 0.1-0.2 keV lower than other data in the range where comparisons are possible (1-3 MeV).
# Primarily based on (n,γ) data.
@ From (n,n′γ) or (n,γ), except as noted.

$^{62}_{28}Ni_{34}$-12

Adopted Levels, Gammas (continued)

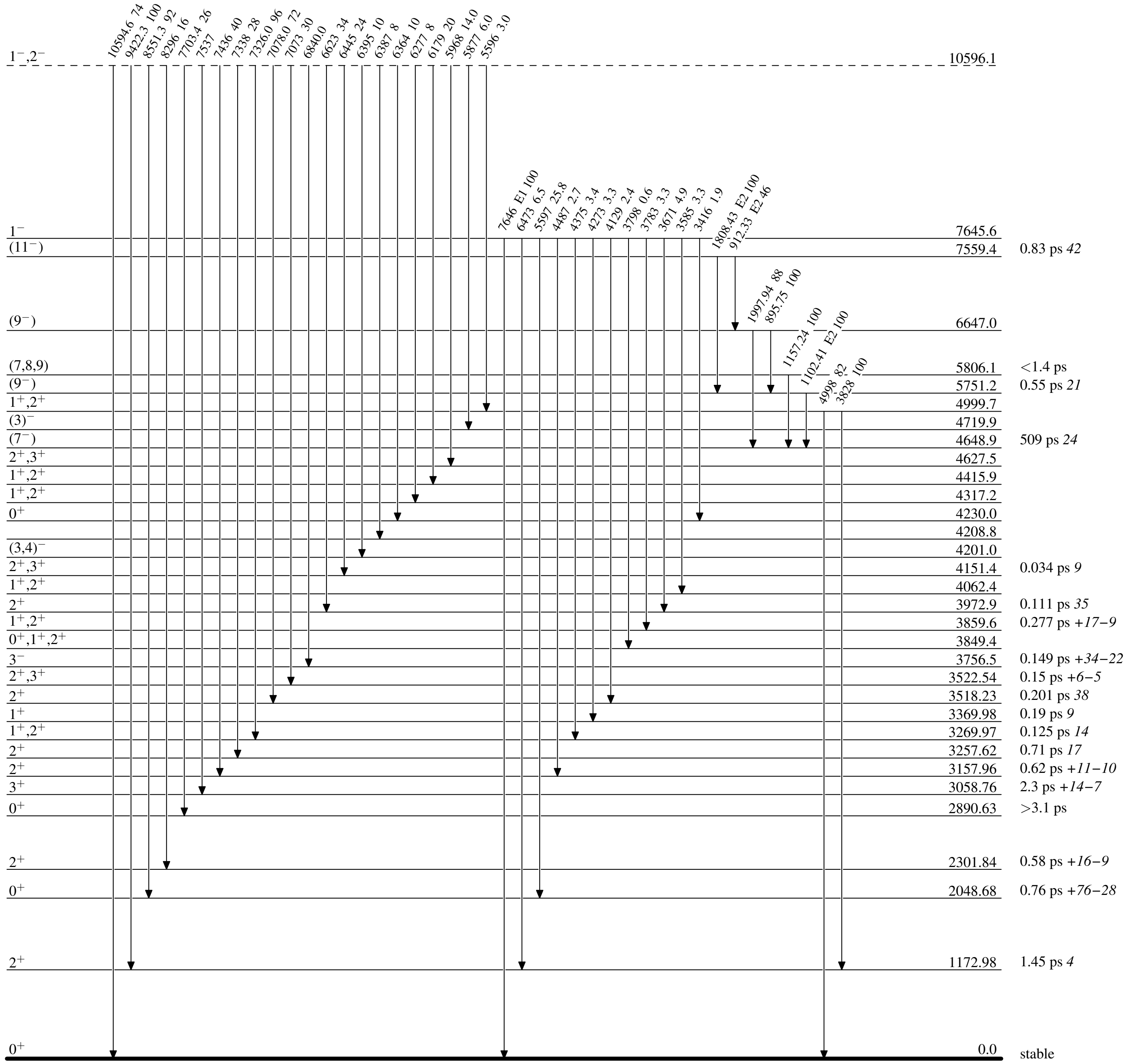
$\gamma(^{62}\mathrm{Ni})$ (continued)

[&] From RUL and $\gamma(\theta)$ in $^{48}\mathrm{Ca}(^{18}\mathrm{O},4\mathrm{n}\gamma)$.
[a] From $\gamma(\theta)$ in $^{48}\mathrm{Ca}(^{18}\mathrm{O},4\mathrm{n}\gamma)$.
[b] Mult=D+Q from $\gamma(\theta)$. $\Delta\pi$=no from level scheme.
[c] Mult=Q from $\gamma(\theta)$. $\Delta\pi$=no from level scheme.
[d] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

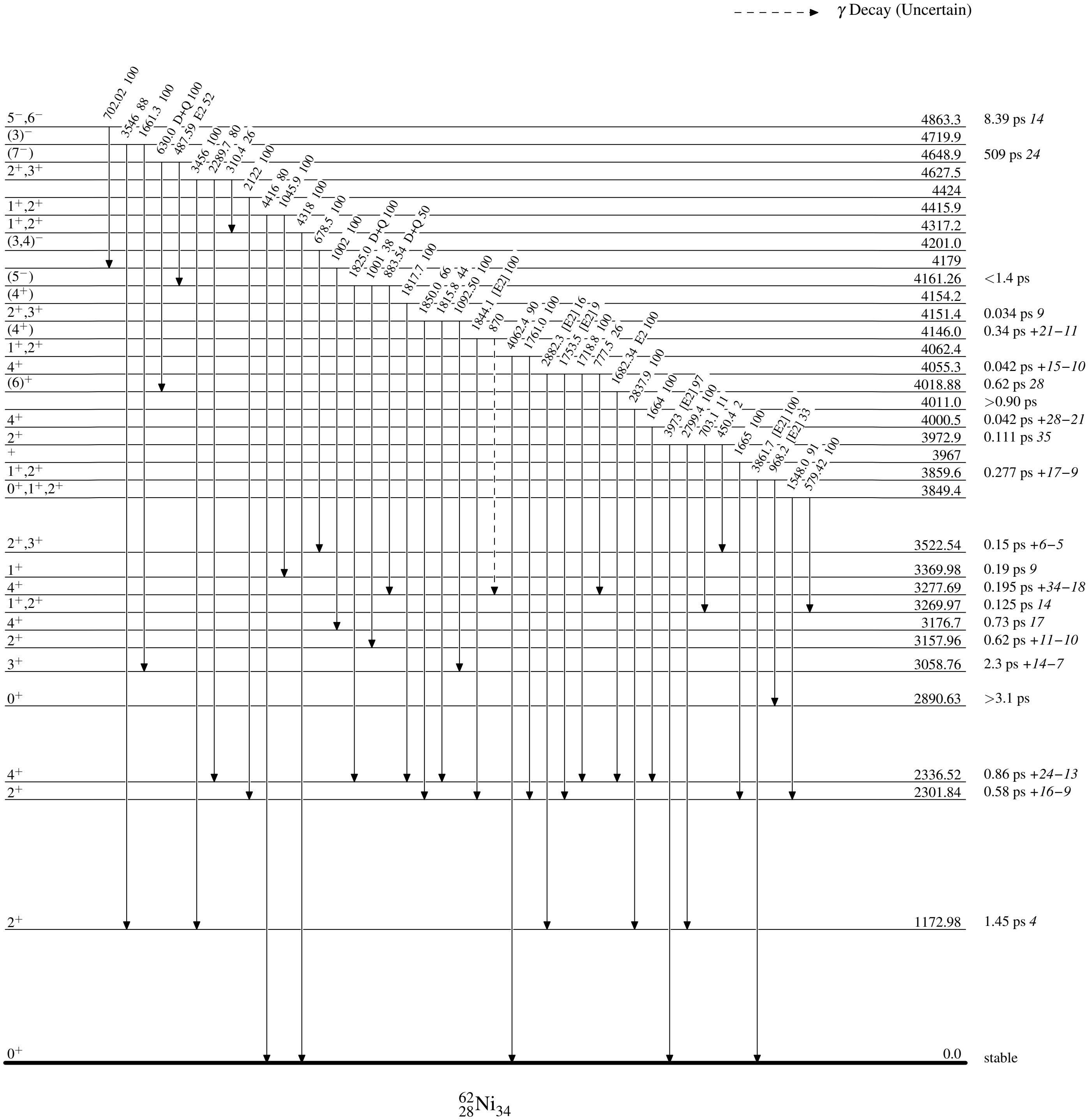


$^{62}_{28}Ni_{34}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



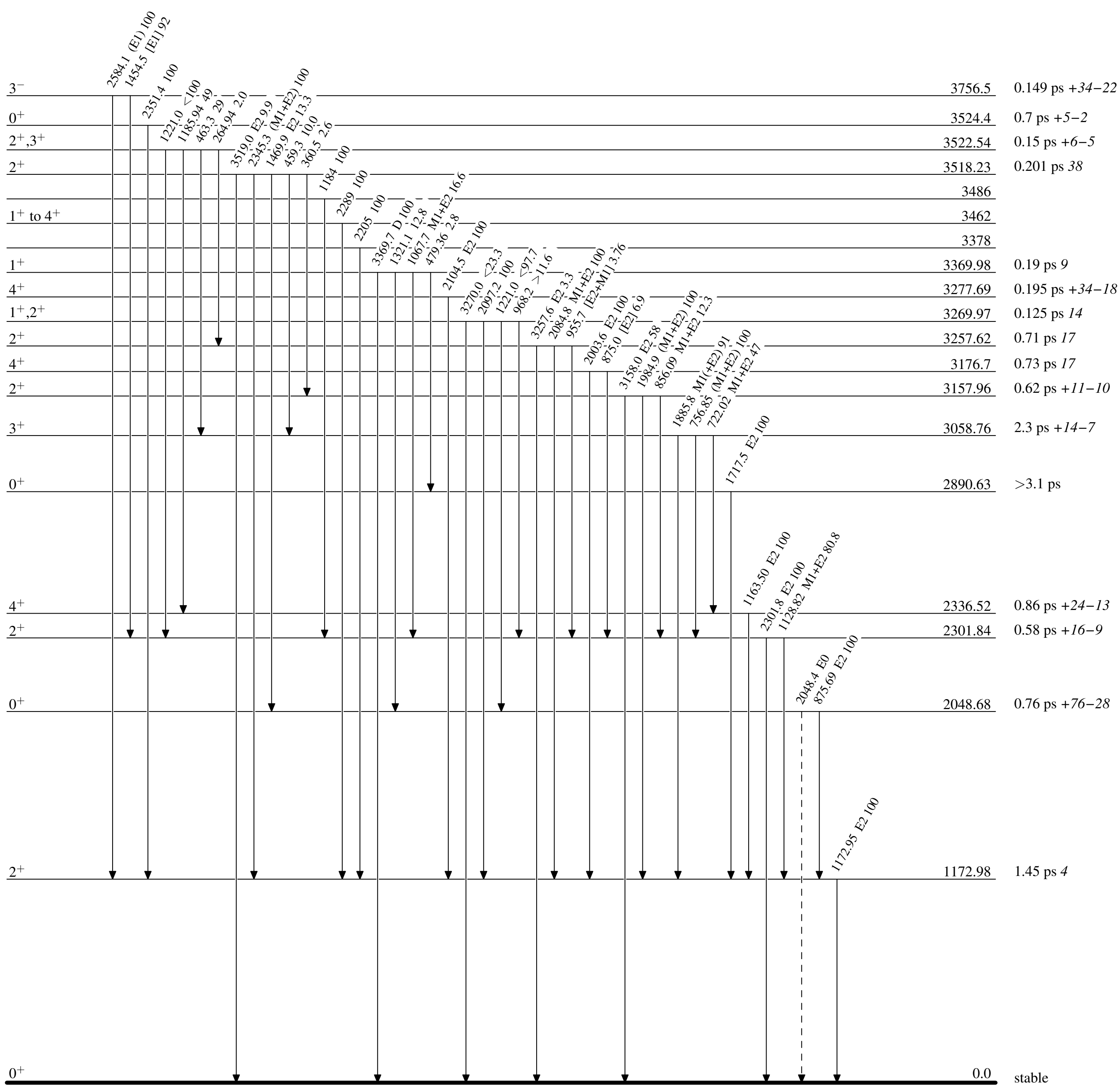
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



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

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 178,41 (2021).	12-Nov-2021

Q(β^-)=−1674.62 *21*; S(n)=9657.46 *20*; S(p)=12536 *19*; Q(α)=−8111 *3* 2021Wa16
S(2n)=16495.23 *21*, S(2p)=22798.9 *28* (2021Wa16).
Mass measurements: 2007Gu09, 2005Gu36, 2004He32, 1974De22.
Following reactions deal with cross sections or reaction mechanism:
^{66}Zn(^{14}C,^{16}O): 1981Be40 (72 MeV).
^{65}Cu(n,d), (n,np): 1987Ah01 (9,11 MeV), 1982Sh28 and 1979Sh25 (14.2 MeV), 1979Gr06 (14.8 MeV), 1967Ch02 (14 MeV), 1965Fa06 (14 MeV).
Additional information 1.
^{65}Cu(γ,p): 1971We06 (17 MeV), 1968Ab10 (≤26 MeV).
^{65}Cu(p,2p): 1977Sh03 and 1977ShZQ (17 MeV).
^{64}Ni(d,np): 1971Ne07 and 1970Ne16 (13.6 MeV), 1968Cu04 (<16 MeV).
^{64}Ni(π,Xγ) E=100, 160, 220 MeV: 1978Ja19. Measured prompt and β delayed spectra of residual nuclides.
^{64}Ni(π^-,γ): 1990Ku08.
Muonic atom: 1976Sh21.
Antiprotonic atom: 2001Tr23.
^{64}Ni(π,X): mesic atom: 1990Ku08.
^{64}Ni(t,t) E=20 MeV: 1969Fl06: Measured $\sigma(\theta)$.
^{64}Ni(a,dd): 1988Me14 (96 MeV).
^{65}Cu(n,d) E=6-16 MeV: 1997Di07: analysis of σ(E) data.
^{62}Ni(^{18}O,^{16}O): 1973Au02 (50,57,65 MeV).
Hyperfine structure, isotope shift measurement with optical method: 1980St21.
Consult NSR database for theory references on nuclear structure.
^{64}Zn can decay by double β decay to ^{64}Ni. Many measurements have been reported dealing with search for β transition to ^{64}Ni g.s.. No definitive decay has been observed, upper limits on ^{64}Zn half-life have been established. The latest reports are 2020Az05, 2011Be39, 2010Be41, 2009Be27, 2009Da16, 2008Be02, 2007Bl15, 2006Wi12, 2006Zu02. For details, see $T_{1/2}$ comment for g.s. of ^{64}Zn in Adopted Levels for ^{64}Zn.

^{64}Ni Levels

Cross Reference (XREF) Flags

A	^{64}Co β^- decay (0.30 s)	K	^{64}Ni(π,X):mesic atom	U	^{65}Cu(d,^{3}He)
B	^{64}Cu ε decay (12.7006 h)	L	^{64}Ni(n,n′)	V	^{65}Cu(t,α)
C	^{62}Ni(t,p)	M	^{64}Ni(n,n′γ)	W	^{67}Zn(n,α)
D	^{62}Ni(α,^{2}He)	N	^{64}Ni(p,p′)	X	^{68}Zn(d,^{6}Li)
E	^{62}Ni(^{12}C,^{10}C)	O	^{64}Ni(p,p′γ)	Y	^{208}Pb(^{64}Ni,^{64}Ni′γ)
F	^{62}Ni(^{18}O,^{16}Oγ)	P	^{64}Ni(d,d′),(pol d,d′)	Z	^{238}U(^{64}Ni,^{64}Ni′γ)
G	^{63}Ni(n,γ) E=th	Q	^{64}Ni(^{3}He,^{3}He′)	Others:	
H	^{63}Ni(n,γ):resonances	R	^{64}Ni(α,α′)	AA	^{238}U(^{70}Zn,Xγ)
I	^{64}Ni(e,e′)	S	^{64}Ni(α,α′γ)	AB	Coulomb excitation
J	^{64}Ni(π^+,π^+),(π^-,π^-)	T	^{64}Ni(x,x′):inelastic scatt	AC	Muonic atom

E(level)†	J$^\pi$‡	$T_{1/2}$	XREF	Comments
0.0	0$^+$	stable	ABCD FG IJ LMNOPQRSTUVWXYZ	XREF: Others: AA, AB Evaluated rms charge radius <r^2>$^{1/2}$=3.8572 fm *23* (2013An02). Evaluated δ<r^2>(^{60}Ni,^{64}Ni)=+0.338 fm^2 *10* (2013An02). Measured δ<r^2>(^{60}Ni,^{64}Ni)=+0.368 fm^2 *9*; deduced total charge radius R$_c$(^{64}Ni)=3.854 fm *2* (2020Ka22). Measured isotope shift $\delta\nu$(^{60}Ni,^{64}Ni)=+1027.2 MHz *25*(stat)

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{64}Ni Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$	XREF	Comments
				77(syst) (2020Ka22). Measured $\delta<r^2>(^{64}Ni,^{58}Ni)=+0.6362$ fm^2 *48*; $\delta<r^2>(^{64}Ni,^{60}Ni)=+0.3631$ fm^2 *48* (2021Ko18). Measured isotope shift $\delta\nu(^{64}Ni,^{58}Ni)=+1534.3$ MHz *26*, $\delta\nu(^{64}Ni,^{60}Ni)=+1028.2$ MHz *26* (2021Ko18).
1345.777 *23*	2^+	1.086 ps *35*	ABCD FG IJ LMNOPQRSTUVWXYZ	XREF: Others: AA, AB μ=+0.37 *6* (2001Ke02,2001Ke08,2020StZV) Q=+0.35 *20* (1971ChZT,2016St14,2021StZZ) B(E2)↑=0.0705 *29* β_2=0.206 *21* (1989Va02) XREF: Q(1320). Jπ: L(t,p)=L(α,α′)=L(d,d′)=L(p,p′)=2 from 0^+. $T_{1/2}$: weighted average of 1.065 ps *116* from RDDS in $^{238}U(^{64}Ni,^{64}Ni'\gamma)$ (2017Kl01) and 1.088 ps *35* from DSAM in Coul. Ex. (2001Ke08,2001Ke02). Others: 0.017 ps *8* from DSAM in (n,n′γ) (1983El03, 1989Ge09); 0.28 ps *10* from DSAM in (α,α′γ) (1974Iv01); 0.91 ps *4* from adopted B(E2)↑=0.0705 *29*. μ: from transient-fields in Coul. ex. (2001Ke02,2001Ke08). Other: +0.92 *26* (1978Ha13,1979BrZP) from Coul. ex. Q: from Coul. ex. (1971ChZT). 2021StZZ and 2016St14 list rounded value of 0.4 *2*. B(E2)↑: weighted average of 0.070 *10* from (^{18}O,^{16}Oγ) (2020Ma37), 0.071 *3* from (e,e′); 0.0718 *29* (2014Al20), 0.065 *4* (1971ChZT), 0.087 *17* and 0.077 *15* (1960An07), 0.090 *18* (1959Al95) from Coul. ex. Others: 0.069 *5* from inelastic scattering (1996Ch03); see also (α,α′) dataset for deformation parameter. β_2: from (pool p,p′). In (α,α′) (1971Go36), negative sign is indicated from relative phase of σ(θ) for (α,α) and (α,α′). Others: 0.13 to 0.22 (see (π,π′), (p,p′); (d,d′); (^{3}He,^{3}He′); (α,α′); inelastic scattering).
2276.58 *3*	2^+		A C FG I MNOP R UV XYZ	XREF: Others: AB E(level),Jπ: spin=2 from γγ(θ) in $^{238}U(^{64}Ni,^{64}Ni'\gamma)$; parity from L(d,^{3}He)=L(t,α)=1 from 3/2$^-$. Other: L(p,p′)=(0) proposed (1963Di11) for a weak group at 2275 and Jπ=0^+ assumed by 1987Ba78 in the analysis of σ(θ) for a 2280 group in (α,α′) suggest an additional (0^+) level near 2275. B(E2)↑<0.0002 (e,e′) (1988Br10).
2477 *7*	6^+		N P	XREF: N(?). E(level): from (p,p′). Other: 2490 from (d,d′). Jπ: L(d,d′)=6 from 0^+.
2610.04 *9*	4^+	1.73 ps *28*	C F I MNOP R UV XYZ	XREF: Others: AA, AB $T_{1/2}$: from DSA in Coul. Ex. (2001Ke08). Other: >0.31 ps from DSA in (n,n′γ) (1989Ko54). Jπ: 1264.3γ E2 to 2^+; L(t,p)=L(e,e′)=L(p,p′)=4 from 0^+. B(E4)↑=0.0018 *4* (e,e′) (1988Br10). β_4=0.09 (1969Be20), 0.07 (1974Ba74).
2867.40 *10*	0^+	1.45 ps *10*	A C FG MNOP UV YZ	XREF: Others: AB Jπ: L(t,p)=0 from 0^+; spin=0 from γγ(θ) in $^{238}U(^{64}Ni,^{64}Ni'\gamma)$ Other: L(p,p′)=(2) from 0^+ and L(d,^{3}He)=1+3 from 3/2$^-$ could indicate a separate level.

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Adopted Levels, Gammas (continued)

^{64}Ni Levels (continued)

E(level)†	J$^{\pi}$‡	T$_{1/2}$	XREF	Comments
				T$_{1/2}$: from B(E2) in Coulomb excitation (2020Ma37); also 1.4 ps *6* from RDDS in ^{62}Ni(^{18}O,^{16}Oγ) (2020Ma37). Value of 0.04 ps *2* from DSAM in (n,n′γ) (1989Ko54) seems discrepant.
2972.11 *6*	(1,2$^+$)	0.13 ps *+13−5*	A C FG I MN V Z	E(level): probable doublet in (t,p) and (p,p′). J$^{\pi}$: 2972.0γ to 0$^+$. J$^{\pi}$=(2$^+$) from L(t,p)=(2) for one member of the doublet. 2$^+$ proposed by 2020Ma37 in (^{18}O,^{16}Oγ) but no arguments given. T$_{1/2}$: from DSAM in (n,n′γ) (1989Ko54).
2982.94 *14*	(3$^+$)		F O Z	J$^{\pi}$: proposed by 2012Br15 based on $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ).
3025.84 *4*	0$^+$	3.6 ps *12*	A C FG MNOP Z	XREF: Others: AB J$^{\pi}$: spin=0 from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ); 1680.1γ E2 to 2$^+$. T$_{1/2}$: from RDDS in ^{62}Ni(^{18}O,^{16}Oγ) (2020Ma37). Other: 4.1 ps *+5−4* from B(E2) in Coulomb excitation (2020Ma37) and adopted branching ratio of 1680γ.
3153.72 *4*	2$^+$		A c eFG R v	J$^{\pi}$: L(α,α′)=2 from 0$^+$. Other: 1$^+$ reported by 2020Ma37 in ^{62}Ni(^{18}O,^{16}Oγ), but no arguments given.
3165.81 *15*	4$^+$	0.13 ps *+17−5*	c eF I MNOP v YZ	J$^{\pi}$: spin=4 from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ); parity from L(e,e′)=L(p,p′)=4 from 0$^+$. T$_{1/2}$: from DSAM in (n,n′γ) (1989Ko54). B(E4)↑=0.00058 *14* (e,e′) (1988Br10).
3275.99 *5*	2$^+$	0.24 ps *3*	A C FG I MNOP R V	J$^{\pi}$: L(t,p)=L(α,α′)=2 from 0$^+$. T$_{1/2}$: from B(E2)↑=0.0025 *1* from (e,e′) (1988Br10) and adopted branching of 3275.9γ.
3395.89 *12*	4$^+$		C F I MNOP V YZ	J$^{\pi}$: spin=4 from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ); parity from L(t,α)=3 from 3/2$^-$.
3463.62 *5*	0$^+$#		FG MN v Z	XREF: Others: AB J$^{\pi}$: spin=0 from $\gamma\gamma(\theta)$ in (n,γ) E=th (2020Ma37); 2117.86γ to 2$^+$; primary γ from 1$^-$ expected to be E1.
3482 *5*	(2$^+$,3,4$^+$)		MNO v	Additional information 2. J$^{\pi}$: probable 2136γ to 2$^+$ and 872γ to 4$^+$.
3559.90 *18*	3$^-$		C eF IJ MNOPQR v YZ	B(E3)↑=0.026 *5* (1988Br10,2002Ki06) β_3=0.203 *20* (1989Va02) XREF: R(3580). J$^{\pi}$: spin=3 from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ); L(t,p)=L(α,α′)=L(p,p′)=L(e,e′)=3 from 0$^+$. B(E3)↑: from (e,e′), average (by 2002Ki06) of two values: 0.031 and 0.026 listed by 1988Br10 using two different models. Others: 0.022 or 0.024 ((α,α′), 1985Al24) and (π,π′) (1993Pe09). β_3: from (pol p,p′). Others: 0.11-0.17 (see (p,p′); (d,d′); (^{3}He,^{3}He′); (α,α′)).
3578.66 *5*	(1$^+$)		A e G	XREF: G(?). J$^{\pi}$: 3578.3γ to 0$^+$; 2012Pa39 in ^{64}Co β^- decay proposed (1$^+$) based on non-observation in (t,p) and 278.6γ most likely M1 from 3856 level with parity=(+).
3647.99 *7*	2$^+$		C FG MNOP V	J$^{\pi}$: spin=2 from $\gamma\gamma(\theta)$ in (n,γ) E=th (2020Ma37); L(t,α)=3 from 3/2$^-$.

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Adopted Levels, Gammas (continued)

^{64}Ni Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$	XREF	Comments
3748.99 *6*	2^+	>0.5 ps	c FG mnop uv	XREF: Others: AB Jπ: spin=2 from γγ(θ) in (n,γ) E=th (2020Ma37); 2403.25γ M1+E2 to 2^+. $T_{1/2}$: from line-shape analysis for 2403γ observed in ^{65}Cu(^{11}B,^{12}Cγ) (2020Ma37). See ^{62}Ni(^{18}O,^{16}Oγ) dataset.
3749.29 *17*	$4^{(-)}$		c mnop R uv YZ	Jπ: spin=4 from γγ(θ) in ^{238}U(^{64}Ni,^{64}Ni′γ); 189γ to 3^- and 99.9γ from 5^- are most likely M1. But L(α,α′)=(4) for a group at 3745 suggests (4^+).
3798.7	2^+		c FG MNO uv	Additional information 3. E(level): from (^{18}O,^{16}Oγ) (2020Ma37). Other: 3797 *5* from (p,p′). Jπ: probable 2451γ to 2^+; 2020Ma37 in (n,γ) E=th state that J^π=2^+ is firmly established, but no further details are given.
3808 *7*			c e MN uv	E(level): from (p,p′).
3849.13 *17*	5^-		c eF I MnOP R V YZ	XREF: Others: AA Jπ: L(e,e′)=L(α,α′)=5 from 0^+ and L(t,α)=4 from $3/2^-$. Possible dominant configuration=$\nu g_{9/2}\nu p_{1/2}$ (1994Pa20). B(E5)↑=0.00055 *3* (e,e′) (1988Br10).
3856.59 *22*	0^+		A c eFG n	Jπ: 2020Ma37 in (n,γ) E=th note that 0^+ is established based on a 702γ-3154γ correlation cascade from a (n,γ) E=th experiment at ILL, which has not been published.
3963 *7*	(0^+ to 4^+)		C NOP	Additional information 4. E(level): weighted average of 3958 *10* from (t,p) and 3965 *7* from (p,p′). Jπ: probable 2671γ to 2^+.
4076 *3*	4^+		cDe I Mn p r V	E(level): from (e,e′). L(α,α′)=(4,5) suggests a doublet with J^π=4^+ and 5^-. Jπ: L(e,e′)=4 from 0^+ and L(t,α)=3 from $3/2^-$. B(E4)↑=0.00030 *7* (e,e′) (1988Br10).
4085.07 *19*	$5^{(-)}$		c eF nOp r YZ	Jπ: spin=5 from γγ(θ) in ^{238}U(^{64}Ni,^{64}Ni′γ); 236.2γ to 5^- is most likely M1; L(α,α′)=(4,5) suggests a doublet with J^π=4^+ and 5^-.
4137 *7*			e N	E(level): from (p,p′).
4172.53 *19*	$6^{(-)}$		n YZ	Jπ: spin=6 from γγ(θ) in ^{238}U(^{64}Ni,^{64}Ni′γ); 323.4γ to 5^- and 359.4γ from 7^- are most likely M1. Possible configuration=$\nu g_{9/2}\nu p_{3/2}+\nu g_{9/2}\nu f^{-1}_{5/2}$ (1994Pa20).
4174 *7*	(1,2)		nO	Additional information 5. Jπ: probable 4174γ to 0^+.
4216 *3*	4^+		C I NO V	XREF: C(4211)N(4210)V(4211). Additional information 6. E(level): weighted average of 4218 *3* from (e,e′), 4210 *7* from (p,p′), 4211 *10* from (t,p) and 4211 *11* from (t,α). Jπ: L(e,e′)=4 and L(t,α)=3 from $3/2^-$, but L(t,p)=(0) is in disagreement. B(E4)↑=0.0011 *3* (e,e′) (1988Br10).
4244 *7*			C N u	E(level): weighted average of 4239 *10* from (t,p) and 4247 *7* from (p,p′).
4268.22 *5*	$0^{+\#}$		A C FG NO u	Jπ: 688.0γ to (1^+), 1114.6γ to 2^+; probable allowed β^- feeding from 1^+ parent.
4285 *7*			N u	E(level): from (p,p′). Jπ: L(d,^{3}He)=3 from $3/2^-$ for a group at 4290 *50*.

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Adopted Levels, Gammas (continued)

^{64}Ni Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$	XREF	Comments
4346 *6*			C I NO v	Additional information 7. E(level): weighted average 4344 *10* from (t,p), 4347 *6* from (e,e′), and 4346 *7* from (p,p′). Jπ: L(t,α)=3 from 3/2$^-$ gives J^π=(1 to 5)$^+$ for a group at 4358 *11*.
4369 *7*			c N v	E(level): from (p,p′).
4397 *7*			NO	Additional information 8. E(level): from (p,p′).
4417.6 *3*	(0$^+$ to 4$^+$)		N Z	Jπ: 2141γ to 2$^+$.
4453 *7*			NO	Additional information 9. E(level): from (p,p′).
4477.1 *4*	(6$^+$)		N Z	Jπ: proposed by 2012Br15 in ^{238}U(^{64}Ni,^{64}Ni′γ).
4493 *6*	2$^+$		C I N	E(level): from (e,e′). Others: 4491 *10* from (t,p) and 4494 *7* from (p,p′). Jπ: L(e,e′)=2 from 0$^+$. B(E2)↑=0.0014 *2* from (e,e′) (1988Br10).
4521 *7*			C NO	XREF: O(4510). E(level): weighted average of 4524 *10* from (t,p) and 4520 *7* from (p,p′).
4531.91 *22*	7$^-$		DE YZ	XREF: D(4600)E(4520). Jπ: spin=7 from γγ(θ) in ^{238}U(^{64}Ni,^{64}Ni′γ); L(α,^{2}He)=7 from 0$^+$. Possible configuration=$\nu g_{9/2}\nu p_{3/2}+\nu g_{9/2}\nu,f^{-1}_{5/2}$ (1994Pa20). 1990Fi07 suggest configuration=$\nu f_{5/2}\nu g_{9/2}$.
4556.4 *4*	(0$^+$,1$^+$,2$^+$)		A C N v	XREF: N(4548). Jπ: probable allowed β$^-$ feeding from 1$^+$ parent.
4573.16 *5*	2$^+$		G I NO v	Jπ: L(e,e′)=2 from 0$^+$; 4572.9γ to 0$^+$, probable 1963γ to 4$^+$. B(E2)↑=0.0013 *2* in (e,e′) (1988Br10).
4584 *7*			N R	E(level): from (p,p′).
4615.57 *7*	(1,2)		c G N	XREF: c(4620). Jπ: 4615.3γ to 0$^+$.
4640.66 *6*	2$^+$	25.9 fs *+7−5*	c G I NO V	XREF: c(4620)N(4632). E(level): possible doublet in (p,p′). Jπ: L(e,e′)=2 from 0$^+$ and L(t,α)=3 from 3/2$^-$. $T_{1/2}$: from B(E2)↑=0.0030 *5* in (e,e′) (1988Br10) and adopted branching of 4640.3γ.
4670 *7*			N	
4692 *7*			C N	E(level): from (p,p′). Other: 4692 *10* from (t,p).
4704.12 *6*	0$^+$#		FG	Jπ: 3358.2γ to 2$^+$ and primary γ from 1$^-$.
4711.99 *23*	(6$^-$)		Z	Jπ: proposed in ^{238}U(^{64}Ni,^{64}Ni′γ) based on 6262.8γ to 5$^-$.
4719 *3*	4$^+$		c I NO	XREF: c(4732)O(4730). Additional information 10. E(level): weighted average of 4719 *3* from (e,e′), and 4720 *7* from (p,p′). Probable doublet in (p,p′γ). Jπ: L(e,e′)=4 from 0$^+$. B(E4)↑=0.00040 *10* (e,e′) (1988Br10).
4741 *7*			c N	XREF: c(4732). E(level): from (p,p′).
4759 *6*	(1,2)		C I NO V	Additional information 11. E(level): weighted average of 4750 *10* from (t,p), 4760 *6* from (e,e′), 4762 *7* from (p,p′) and 4762

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Adopted Levels, Gammas (continued)

^{64}Ni Levels (continued)

E(level)†	Jπ‡	XREF	Comments
			11 from (t,α). Jπ: probable 4759γ to 0^+.
4800 *7*	(1^+ to 5^+)	N V	E(level): weighted average of 4796 *7* from (p,p′) and 4811 *11* from (t,α). Jπ: L(t,α)=3 from $3/2^-$.
4868.54 *6*	(1,2)	G	Jπ: 4868.3γ to 0^+.
4889 *6*	2^+	C I N V	E(level): weighted average of 4886 *10* from (t,p), 4887 *6* from (e,e′), 4894 *7* from (p,p′), and 4888 *11* from (t,α). Jπ: L(t,p)=2 from 0^+ and L(t,α)=1 from $3/2^-$.
4928 *7*		NO	Additional information 12. E(level): from (p,p′).
4962.2 *6*	(6^-,7^-,8^-)	Y	Jπ: 430.3γ to 7^- most likely M1.
4963 *7*	(0^+ to 4^+)	C NO u	XREF: O(4970)u(5000). Additional information 13. E(level): weighted average of 4958 *10* from (t,p) and 4966 *7* from (p,p′). Jπ: probable 3617γ to 2^+.
4991 *6*	2^+	C I NO uv	XREF: O(5000)u(5000)v(5011). Additional information 14. E(level): weighted average of 4993 *6* from (e,e′), 4985 *10* from (t,p), and 4991 *7* from (p,p′). Others: 5000 *50* from (d,^{3}He) probably a multiplet; 5011 *11* from (t,α) probably a doublet. Jπ: L(e,e′)=2 from 0^+. See also comment for 5009 level. B(E2)↑=0.0030 *2* from (e,e′) (1988Br10).
5009 *10*		N uv	XREF: u(5000)v(5011). E(level): from (p,p′). Jπ: L(t,α)=3 from $3/2^-$ from a probable doublet at 5011 *11* and L(d,^{3}He)=3 from $3/2^-$ for a probable multiplet at 5000 *50*.
5027 *10*		c N uv	E(level): weighted average of 5026 *10* from (t,p) and 5028 *10* from (p,p′). Jπ: see comment for 5009 level.
5065 *10*		N	
5093 *3*	4^+	C I NO V	Additional information 15. E(level): weighted average of 5085 *10* from (t,p), 5095 *3* from (e,e′), 5087 *10* from (p,p′) and 5090 *11* from (t,α). Jπ: L(e,e′)=4 from 0^+ and L(t,α)=3 from $3/2^-$. B(E4)↑=0.0013 *3* from (e,e′) (1988Br10).
5107 *10*		N	
5123 *10*		N	
5155.56 *7*	(0^+,1,2,3^-)	C G No	XREF: C(5146)o(5160). Jπ: 3809.6γ to 2^+ and primary γ from 1^-.
5169 *10*		C No	XREF: C(5164)o(5160). E(level): weighted average of 5164 *10* from (t,p) and 5174 *10* from (p,p′).
5188 *10*		N	
5215 *3*	4^+	C E I NO V	XREF: E(5200). Additional information 16. E(level): weighted average of 5209 *10* from (t,p), 5216 *3* from (e,e′), 5217 *10* from (p,p′) and 5210 *11* from (t,α). Other: 5200 *50* from (^{12}C,^{10}C). Jπ: L(e,e′)=4 from 0^+ and L(t,α)=3 from $3/2^-$. B(E4)↑=0.00053 *14* from (e,e′) (1988Br10).
5229 *10*		N	
5264 *10*		c N v	XREF: c(5273)v(5278). E(level): from (p,p′).
5285 *10*	(2^+,3,4^+)	c NO v	XREF: c(5273)v(5278).

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Adopted Levels, Gammas (continued)

^{64}Ni Levels (continued)

E(level)†	Jπ‡	XREF	Comments
			Additional information 17. E(level): from (p,p′). Jπ: probable 2675γ to 4+ and 3939γ to 2+.
5332 *10*		N	
5355 *10*		C N	E(level): weighted average of 5358 *10* from (t,p) and 5351 *10* from (p,p′).
5369 *3*	3−	I N R v	XREF: v(5378). E(level): from (e,e′). Others: 5370 *10* from (p,p′), 5378 *11* from (t,α). Jπ: L(e,e′)=3 from 0+ and L(t,α)=2 from 3/2−. But the 5378 group in (t,α) may correspond to 5369 and/or 5386. B(E3)↑=0.0020 *4* from (e,e′) (1988Br10).
5383 *7*	(0+ to 4+)	NO v	XREF: v(5378). Additional information 18. E(level): from (p,p′). Jπ: probable 3106γ and 4037γ to 2+.
5408 *6*	2+	c I n	E(level): from (e,e′). Jπ: L(e,e′)=2 from 0+. B(E2)↑=0.0036 *5* from (e,e′) (1988Br10).
5418.21 *7*	(1)−	c G n V	Jπ: L(t,α)=2 from 3/2− and 5417.9γ to 0+.
5439 *10*	(5−)	DE N	E(level): weighted average of 5430 *50* from (α,^{2}He), 5410 *50* from (^{12}C,^{10}C), and 5441 *10* from (p,p′). Jπ: L(α,^{2}He)=5 from 0+; possible configuration=$\nu f_{5/2}\otimes\nu d_{5/2}$ (1990Fi07).
5484 *3*	(3−)	I NO UV	Additional information 19. E(level): from (e,e′). Other: 5480 *10* from (p,p′), 5481 *11* from (t,α), 5500 *100* from (d,^{3}He). Jπ: L(e,e′)=(3) from 0+, but L(t,α)=1 from 3/2− gives (0 to 3)+. B(E3)↑=0.00067 *13* from (e,e′) (1988Br10).
5507 *10*		N	
5536 *10*		C NO	XREF: O(5550). E(level): weighted average of 5535 *10* from (t,p) and 5537 *10* from (p,p′).
5567 *11*		V	
5614 *10*	(2+)	C	Jπ: L(t,p)=(2) from 0+.
5663 *10*	(1+ to 5+)	C V	E(level): weighted average of 5660 *10* from (t,p) and 5667 *11* from (t,α). Jπ: L(t,α)=3 from 3/2−.
5734 *3*	4+	I	Jπ: L(e,e′)=4 from 0+. B(E4)↑=0.0022 *5* from (e,e′) (1988Br10).
5735.8 *3*	(7−)	Z	Jπ: proposed in ^{238}U(^{64}Ni,^{64}Ni′γ).
5759 *11*	0− to 4−	V	Jπ: L(t,α)=2 from 3/2−.
5768.75 *8*	0+#	FG NO	Jπ: 3492.3γ to 2+ and primary γ from 1−.
5812.0 *3*	8+	DE YZ	Jπ: spin=8 from γγ(θ) in ^{238}U(^{64}Ni,^{64}Ni′γ); L(α,^{2}He)=8,(6) from 0+. Possible configuration=$\nu g^2_{9/2}$ (1990Fi07,1994Pa20).
5817 *6*	3−	I	Jπ: L(e,e′)=3 from 0+. B(E3)↑=0.00073 *14* from (e,e′) (1988Br10).
5843 *11*		V	
5870		NO	E(level): from (p,p′) and (p,p′γ).
5902 *11*	(1−,2−)	NO V	XREF: N(5910)O(5910). E(level): from (t,α). Jπ: L(t,α)=0 from 3/2−.
5976 *11*	(1+ to 5+)	V	Jπ: L(t,α)=3 from 3/2−.
6018 *3*	3−	I	Jπ: L(e,e′)=3 from 0+. B(E3)↑=0.00118 *23* from (e,e′) (1988Br10).

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Adopted Levels, Gammas (continued)

^{64}Ni Levels (continued)

E(level)†	J^{π}‡	XREF	Comments
6040 *50*	(6^+)	DE	E(level): weighted average of 6030 *50* from (α,^{2}He) and 6050 *50* from (^{12}C,^{10}C). J^{π}: L(α,^{2}He)=6,(8) from 0^+. Possible configuration=$\nu g_{9/2}\nu d_{5/2}$ (1990Fi07).
6060 *11*	$1^-,2^-$	NO UV	E(level): from (t,α). Other: 6.05E3 *10* from (d,^{3}He). J^{π}: L(t,α)=L(d,^{3}He)=0 from $3/2^-$.
6116 *3*	3^-	I V	E(level): from (e,e′). Other: 6121 *11* from (t,α). J^{π}: L(e,e′)=3 from 0^+. B(E3)↑=0.00118 *23* from (e,e′) (1988Br10).
6182 *11*		V	
6188.7 *4*	$9^{(-)}$	Z	J^{π}: spin=9 from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ); 1656.8γ to 7^-.
6220 *11*		V	
6444 *11*	$(1,2)^+$	O V	Additional information 20. E(level): from (t,α). J^{π}: L(t,α)=3 from $3/2^-$; probable 6444γ to 0^+.
6512 *11*	$1^-,2^-$	V	J^{π}: L(t,α)=0 from $3/2^-$.
6622 *11*		V	
6656 *11*		uV	E(level): from (t,α). J^{π}: L(d,^{3}He)=0 from $3/2^-$ for a doublet at 6700 *100*.
6687 *11*	$1^-,2^-$	uV	E(level): from (t,α). J^{π}: L(t,α)=0 from $3/2^-$.
6754 *11*		NO V	E(level): from (t,α).
6796.0 *5*	(10^+)	Z	J^{π}: proposed in ^{238}U(^{64}Ni,^{64}Ni′γ); 984.0γ to 8^+.
6822 *11*		V	
6838 *11*		V	
6861 *11*		V	
7020 *10*	(1,2)	O	Additional information 21. J^{π}: probable 7020γ to 0^+.
7130		NO	
7220 *10*	(1,2)	O	Additional information 22. J^{π}: probable 7220γ to 0^+.
7.30×10^3 *10*	$0^-,1^-,2^-,3^-,4^-$	U	J^{π}: L(d,^{3}He)=2 from $3/2^-$.
7730 *10*	(1,2)	O	Additional information 23. J^{π}: probable 7330γ to 0^+.
7.95×10^3 *10*	$0^-,1^-,2^-,3^-,4^-$	U	J^{π}: L(d,^{3}He)=2 from $3/2^-$.
8240 *10*	(1,2)	O	Additional information 24. J^{π}: probable 8240γ to 0^+.
9657.86 *20*		H	
9658.05 *20*	$0^-,1^-$	H	J^{π}: s-wave resonance (2018MuZY).
9658.81 *20*	$0^-,1^-$	H	J^{π}: s-wave resonance (2018MuZY).
9664.17 *20*		H	
9665.97 *20*		H	
9666.31 *20*		H	
9666.36 *20*		H	
9666.48 *20*		H	
9667.09 *20*		H	
9669.36 *20*		H	
9670.03 *20*		H	
9671.23 *20*		H	
9671.33 *21*		H	
9673.41 *20*		H	
9674.33 *20*		H	
9675.02 *21*		H	
9676.72 *20*		H	
9676.83 *21*		H	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{64}Ni Levels (continued)

E(level)†	$T_{1/2}$	XREF	Comments
9680.24 *22*		H	
9686.86 *22*		H	
9689.29 *20*		H	
9711.36 *20*		H	
13.2×10^3 *3*	4.8 MeV *3*	I	E(level),$T_{1/2}$: energy and width for a giant quadrupole resonance (1974Gu16).
15.4×10^3 *2*	4.2 MeV *2*	T	E(level),$T_{1/2}$: energy and width for a giant quadrupole resonance (1990Ga07).
15.60×10^3 *30*	5.64 MeV *40*	R	E(level),$T_{1/2}$: energy and width for a giant quadrupole resonance (1992Yo01).
16.4×10^3 *10*	6.8 MeV *1*	J	E(level),$T_{1/2}$: energy and width for a giant quadrupole resonance (1989Oa01).

† From a least-squares fit to γ-ray energies with uncertainties for levels connected with those γ transitions and from reaction data for others, unless otherwise noted. Above ≈4 MeV, due to high level density and limited resolution the correspondence of levels from different reactions is somewhat ambiguous.

‡ Above 3.5 MeV, due to high level density L-transfer values available from only one reaction such as (t,α) or (d,^{3}He) are considered tentative for J^π assignments.

From 2020Ma37 in (n,γ) E=th. The authors state that the decay pattern is only consistent with 0^+ based on an unpublished (n,γ) E=th experiment at ILL and that $\gamma\gamma(\theta)$ of a cascade toward 1346 level also yields firm 0^+ assignment.

Adopted Levels, Gammas (continued)

$\gamma(^{64}\mathrm{Ni})$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	δ	α[&]	Comments
1345.777	2^+	1345.83 *3*	100	0.0	0^+	E2		1.63×10^{-4}	B(E2)(W.u.)=7.76 *26* E_γ: weighted average of 1345.8 *1* from ^{64}Co β^- decay (0.30 s), 1345.77 *6* from ^{64}Cu ε decay (12.700 h), 1345.84 *3* from (n,γ) E=th, 1346.0 *1* from ^{208}Pb(^{64}Ni,^{64}Ni′γ), and 1345.8 *1* from ^{238}U(^{64}Ni,^{64}Ni′γ). Other: 1345.1 *2* from (^{70}Zn,Xγ). Mult.: from ΔJ=2, Q from $\gamma\gamma(\theta)$ data in (^{64}Ni,^{64}Ni′γ), and RUL.
2276.58	2^+	930.81[‡] *3*	100.0 *22*	1345.777	2^+	(M1+E2)	+0.75 *20*		E_γ: others: 930.8 *1* from ^{64}Co β^- decay (0.30 s), 930.8 *1* from ^{208}Pb(^{64}Ni,^{64}Ni′γ), and 930.8 *1* from ^{238}U(^{64}Ni,^{64}Ni′γ). I_γ: from ^{64}Co β^- decay (0.30 s). Other: 100.0 *23* from ^{238}U(^{64}Ni,^{64}Ni′γ). Mult.,δ: D+Q and δ from $\gamma(\theta)$ in (n,n′γ); (M1+E2) from level scheme. Other: δ(Q/D)≈−0.9 from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ).
		2276.6 *1*	0.84 *23*	0.0	0^+				E_γ: from ^{64}Co β^- decay (0.30 s). Other: 2277 *2* from ^{238}U(^{64}Ni,^{64}Ni′γ). I_γ: from ^{238}U(^{64}Ni,^{64}Ni′γ). Other: <2.46 from ^{64}Co β^- decay.
2610.04	4^+	1264.3 *1*	100	1345.777	2^+	E2		1.62×10^{-4}	B(E2)(W.u.)=6.7 *+13−9* E_γ: from (^{64}Ni,^{64}Ni′γ). Other: 1264.0 *2* from (^{70}Zn,Xγ). Mult.: ΔJ=2, Q from $\gamma(\theta)$ in (n,n′γ); and RUL.
2867.40	0^+	1521.6[‡] *1*	100	1345.777	2^+	E2		1.91×10^{-4}	B(E2)(W.u.)=3.15 *+23−21* E_γ: others: 1521.6 *1* from ^{64}Co β^- decay (0.30 s), 1521.5 *4* from ^{208}Pb(^{64}Ni,^{64}Ni′γ) and 1521.5 *2* from ^{238}U(^{64}Ni,^{64}Ni′γ). Mult.: Q from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ); M2 ruled out by RUL.
2972.11	$(1,2^+)$	695.6 *3*	80 *30*	2276.58	2^+				E_γ: weighted average of 695.7 *3* from ^{64}Co β^- decay (0.30 s) and 695.5 *3* from ^{238}U(^{64}Ni,^{64}Ni′γ). I_γ: from ^{64}Co β^- decay (0.30 s). Other: 80 *40* from ^{238}U(^{64}Ni,^{64}Ni′γ).
		1626.30[‡] *7*	100[‡] *20*	1345.777	2^+				E_γ: others: 1626.3 *1* from ^{64}Co β^- decay (0.30 s) and 1626.4 *4* from ^{238}U(^{64}Ni,^{64}Ni′γ). I_γ: others: 100 *40* from ^{64}Co β^- decay (0.30 s) and 100 *60* from ^{238}U(^{64}Ni,^{64}Ni′γ).
		2972.03 *6*	69 *8*	0.0	0^+				E_γ: weighted average of 2972.0 *1* from ^{64}Co β^- decay (0.30 s) and 2972.04 *6* from (n,γ) E=th. Other: 2973 *1* from ^{238}U(^{64}Ni,^{64}Ni′γ).

Adopted Levels, Gammas (continued)

$\gamma(^{64}\mathrm{Ni})$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.	α&	Comments
								E_γ: weighted average of 2972.0 *1* from ^{64}Co β^- decay (0.30 s) and 2972.04 *6* from (n,γ) E=th. Other: 2973 *1* from ^{238}U(^{64}Ni,^{64}Ni$'\gamma$). I_γ: weighted average of 60 *20* from ^{64}Co β^- decay (0.30 s), 70 *8* from (n,γ) E=th, and 80 *40* from ^{238}U(^{64}Ni,^{64}Ni$'\gamma$).
2982.94	(3$^+$)	706.5 *2*	100 *12*	2276.58	2$^+$			
		1637.0 *3*	64 *12*	1345.777	2$^+$			
3025.84	0$^+$	749.23‡ *4*	3.6‡ *2*	2276.58	2$^+$	[E2]	5.05×10^{-4}	B(E2)(W.u.)=1.5 *+8−4* I_γ: from Iγ(749γ)/Iγ(1680γ)=3.6 *2*/100 in (n,γ) E=th (2020Ma37).
		1680.07‡ *4*	100‡	1345.777	2$^+$	E2	2.41×10^{-4}	B(E2)(W.u.)=0.75 *+37−19* E_γ: others: 1680.1 *1* from ^{64}Co β^- decay and 1680.1 *2* from ^{238}U(^{64}Ni,^{64}Ni$'\gamma$). Mult.: Q from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni$'\gamma$); M2 ruled out by RUL.
3153.72	2$^+$	877.16 *5*	62 *9*	2276.58	2$^+$			E_γ: weighted average of 877.2 *1* from ^{64}Co β^- decay (0.30 s) and 877.15 *5* from (n,γ) E=th. I_γ: weighted average of 58 *9* from ^{64}Co β^- decay (0.30 s) and 73 *15* from (n,γ) E=th.
		1807.98 *5*	73 *12*	1345.777	2$^+$			E_γ: weighted average of 1808.0 *1* from ^{64}Co β^- decay (0.30 s) and 1807.97 *5* from (n,γ) E=th. I_γ: from ^{64}Co β^- decay (0.30 s). Other: 75 *16* from (n,γ) E=th.
		3153.69 *7*	100 *5*	0.0	0$^+$			E_γ: weighted average of 3153.7 *1* from ^{64}Co β^- decay (0.30 s) and 3153.68 *7* from (n,γ) E=th. I_γ: from (n,γ) E=th. Other: 100 *18* from ^{64}Co β^- decay (0.30 s).
3165.81	4$^+$	1820.0 *2*	100	1345.777	2$^+$	E2	2.94×10^{-4}	B(E2)(W.u.)=14 *+9−7* E_γ: weighted average of 1820.4 *5* from ^{208}Pb(^{64}Ni,^{64}Ni$'\gamma$) and 1819.9 *2* from ^{238}U(^{64}Ni,^{64}Ni$'\gamma$). Mult.: Q from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni$'\gamma$); M2 ruled out by RUL.
3275.99	2$^+$	1930.2 *1*	26 *8*	1345.777	2$^+$	(M1+E2)@		B(M1)(W.u.)=0.0026 *8*; B(E2)(W.u.)=1.19 *34* E_γ: from ^{64}Co β^- decay (0.30 s). I_γ: weighted average of 14 *9* from ^{64}Co β^- decay (0.30 s) and 32 *6* from (n,γ) E=th. B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		3275.90‡ *6*	100‡ *5*	0.0	0$^+$	[E2]		B(E2)(W.u.)=0.33 *+5−4* E_γ: other: 3275.9 *1* from ^{64}Co β^- decay. I_γ: other: 100 *23* from ^{64}Co β^- decay.
3395.89	4$^+$	230.0 *3*	6.7 *30*	3165.81	4$^+$			
		413.0 *3*	7.4 *19*	2982.94	(3$^+$)			
		785.9 *2*	68 *11*	2610.04	4$^+$			E_γ: other: 785.7 *5* from ^{208}Pb(^{64}Ni,^{64}Ni$'\gamma$). I_γ: weighted average of 81 *13* from ^{208}Pb(^{64}Ni,^{64}Ni$'\gamma$) and 59 *11* from ^{238}U(^{64}Ni,^{64}Ni$'\gamma$).

$^{64}_{28}\mathrm{Ni}_{36}$-11

Adopted Levels, Gammas (continued)

$\gamma(^{64}Ni)$ (continued)

E_i(level)	J^{π}_i	E_{γ}†	I_{γ}†	E_f	J^{π}_f	Mult.	δ	α&	Comments
3395.89	4^+	2049.9 *2*	100 *15*	1345.777	2^+	(E2)			E_{γ}: from $^{238}U(^{64}Ni,^{64}Ni'\gamma)$. Other: 2049.8 *4* from $^{208}Pb(^{64}Ni,^{64}Ni'\gamma)$. I_{γ}: other: 100 *25* from $^{208}Pb(^{64}Ni,^{64}Ni'\gamma)$; $I\gamma(2050\gamma)/I\gamma(786\gamma)$=40/60 in (p,p′γ) is discrepant. Mult.: Q from $\gamma\gamma(\theta)$ in $^{238}U(^{64}Ni,^{64}Ni'\gamma)$; E2 from level scheme.
3463.62	0^+	310‡	4.6‡	3153.72	2^+				
		492‡	1.0‡	2972.11	$(1,2^+)$				
		1187.01 *5*	100 *20*	2276.58	2^+				E_{γ}: weighted average of 1187.02 *3* from (n,γ) E=th and 1186.5 *3* from $^{238}U(^{64}Ni,^{64}Ni'\gamma)$. I_{γ}: from (n,γ) E=th.
		2117.86‡ *7*	19.6‡ *20*	1345.777	2^+	(E2)			Mult.: Q from $\gamma\gamma(\theta)$ in (n,γ) E=th; E2 from level scheme.
3482	$(2^+,3,4^+)$	872#		2610.04	4^+				
		2136#		1345.777	2^+				
3559.90	3^-	1283.4 *3*	28 *6*	2276.58	2^+				E_{γ}: weighted average of 1284.0 *6* from $^{208}Pb(^{64}Ni,^{64}Ni'\gamma)$ and 1283.3 *3* from $^{238}U(^{64}Ni,^{64}Ni'\gamma)$. I_{γ}: from $^{238}U(^{64}Ni,^{64}Ni'\gamma)$. Other: 27 *9* from $^{208}Pb(^{64}Ni,^{64}Ni'\gamma)$.
		2213.8 *3*	100 *13*	1345.777	2^+	(E1)		8.10×10^{-4}	E_{γ}: weighted average of 2214.4 *5* from $^{208}Pb(^{64}Ni,^{64}Ni'\gamma)$ and 2213.7 *2* from $^{238}U(^{64}Ni,^{64}Ni'\gamma)$. I_{γ}: from $^{238}U(^{64}Ni,^{64}Ni'\gamma)$. Other: 100 *27* from $^{208}Pb(^{64}Ni,^{64}Ni'\gamma)$. Mult.: D from $\gamma\gamma(\theta)$ in $^{238}U(^{64}Ni,^{64}Ni'\gamma)$; E1 from level scheme.
		3560#		0.0	0^+	[E3]			
3578.66	(1^+)	2232.89‡ *6*	100‡ *10*	1345.777	2^+				E_{γ},I_{γ}: other: 2232.9 *1* with Iγ=100 *72* from ^{64}Co β^- decay.
		3578.3 *1*	30.5 *15*	0.0	0^+				E_{γ}: weighted average of 3578.3 *1* from ^{64}Co β^- decay and 3578.32 *8* from (n,γ) E=th. I_{γ}: from (n,γ) E=th. Other: <43 from ^{64}Co β^- decay.
3647.99	2^+	2302.30‡ *17*	100‡ *10*	1345.777	2^+	(M1+E2)@			
		3647.86‡ *7*	53.8‡ *28*	0.0	0^+				
3748.99	2^+	1473	20	2276.58	2^+				E_{γ},I_{γ}: from $(^{18}O,^{16}O\gamma)$ (2020Ma37).
		2403.25‡ *7*	100‡ *9*	1345.777	2^+	E2+M1	+1.23 *10*		B(M1)(W.u.)<9.9×10^{-4}; B(E2)(W.u.)<0.42

From ENSDF

$^{64}_{28}Ni_{36}$-12

$\gamma(^{64}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.	δ	α[&]	Comments
									E_γ: other: 2400 from (p,p′γ). Mult.,δ: D+Q and δ from $\gamma\gamma(\theta)$ in (n,γ) E=th (2020Ma37); E1+M2 disfavored by the large δ and RUL.
3748.99	2^+	3748.77[‡] *8*	29.6[‡] *15*	0.0	0^+				
3749.29	$4^{(-)}$	189.2 *3*	100 *9*	3559.90	3^-	(M1)		0.00889	E_γ: weighted average of 189.0 *4* from ^{208}Pb(^{64}Ni,^{64}Ni′γ) and 189.3 *3* from ^{238}U(^{64}Ni,^{64}Ni′γ). I_γ: from ^{238}U(^{64}Ni,^{64}Ni′γ). Other: 100 *17* from ^{208}Pb(^{64}Ni,^{64}Ni′γ). Mult.: D from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ); M1 is most likely.
		583.4 *3*	35 *6*	3165.81	4^+	(E1)		3.34×10^{-4}	E_γ: other: 583.4 *6* from ^{208}Pb(^{64}Ni,^{64}Ni′γ). I_γ: weighted average of 33 *8* from ^{208}Pb(^{64}Ni,^{64}Ni′γ) and 36 *6* from ^{238}U(^{64}Ni,^{64}Ni′γ). Mult.: D from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ); E1 from level scheme.
		766.6 *4*	7.6 *15*	2982.94	(3^+)				
		1139.4 *3*	18 *6*	2610.04	4^+				E_γ: other: 1130 from (p,p′γ).
3798.7	2^+	2453		1345.777	2^+	(M1+E2)[@]			E_γ: from level-energy difference.
3849.13	5^-	99.9 *3*	4.5 *13*	3749.29	$4^{(-)}$	[M1]		0.0469 *8*	E_γ: weighted average of 99.6 *6* from ^{208}Pb(^{64}Ni,^{64}Ni′γ) and 100.0 *3* from ^{238}U(^{64}Ni,^{64}Ni′γ). I_γ: weighted average of 4.2 *14* from ^{208}Pb(^{64}Ni,^{64}Ni′γ) and 4.8 *13* from ^{238}U(^{64}Ni,^{64}Ni′γ).
		289 *1*	0.52 *31*	3559.90	3^-	[E2]		0.0106 *2*	
		453.2 *3*	8.6 *25*	3395.89	4^+	(E1)		6.25×10^{-4}	E_γ: weighted average of 452.9 *6* from ^{208}Pb(^{64}Ni,^{64}Ni′γ) and 453.3 *3* from ^{238}U(^{64}Ni,^{64}Ni′γ). I_γ: unweighted average of 11.1 *14* from ^{208}Pb(^{64}Ni,^{64}Ni′γ) and 6.1 *13* from ^{238}U(^{64}Ni,^{64}Ni′γ). Mult.: D from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ); E1 from level scheme.
		683.6 *4*	0.9 *4*	3165.81	4^+				
		1239.3 *3*	100.0 *9*	2610.04	4^+	(E1)		1.47×10^{-4}	E_γ: unweighted average of 1239.0 *3* from ^{208}Pb(^{64}Ni,^{64}Ni′γ), 1239.0 *1* from ^{238}U(^{64}Ni,^{64}Ni′γ), and 1239.9 *3* from (^{70}Zn,Xγ). I_γ: other: 100 *10* from ^{208}Pb(^{64}Ni,^{64}Ni′γ). Mult.: D from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni′γ); E1 from level scheme.
		2503[#a]		1345.777	2^+	[E3]			
3856.59	0^+	278.6 *3*	10 *5*	3578.66	(1^+)				E_γ,I_γ: from ^{64}Co β^- decay.
		702.2 *3*	100 *5*	3153.72	2^+				E_γ,I_γ: from ^{64}Co β^- decay.

γ(^{64}Ni) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.	$\alpha$$^{\&}$	Comments
3963	(0$^+$ to 4$^+$)	2617$^{\#}$		1345.777	2$^+$			
4085.07	5$^{(-)}$	236.2 *3*	39 *14*	3849.13	5$^-$			E_γ: weighted average of 236.5 *5* from ^{208}Pb(^{64}Ni,^{64}Ni$'\gamma$) and 236.1 *3* from ^{238}U(^{64}Ni,^{64}Ni$'\gamma$). I_γ: weighted average of 50 *20* from ^{208}Pb(^{64}Ni,^{64}Ni$'\gamma$) and 33 *14* from (^{238}U^{64}Ni,^{64}Ni$'\gamma$).
		688.9 *3*	9.5 *24*	3395.89	4$^+$			E_γ: note that a 688.9γ is placed from the 4268 level in ^{64}Co β^- decay.
		1474.9 *3*	100 *14*	2610.04	4$^+$	(E1)		E_γ,I_γ: other: 1474.8 *5* with Iγ=100 *20* from ^{208}Pb(^{64}Ni,^{64}Ni$'\gamma$). Mult.: D from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni$'\gamma$); (E1) from level scheme.
4172.53	6$^{(-)}$	323.4 *1*	100	3849.13	5$^-$	(M1)	0.00239	E_γ: other: 323.4 *2* from ^{208}Pb(^{64}Ni,^{64}Ni$'\gamma$). Mult.: D from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni$'\gamma$); most likely M1.
4174	(1,2)	4174$^{\#}$		0.0	0$^+$			
4216	4$^+$	1606$^{\#}$		2610.04	4$^+$			
4268.22	0$^+$	688.0 *3*	22 *9*	3578.66	(1$^+$)			E_γ,I_γ: from ^{64}Co β^- decay. Poor-fit; level-energy difference=689.56. Note that a 688.9γ is placed from 4085 level in ^{238}U(^{64}Ni,^{64}Ni$'\gamma$).
		1114.58‡ *4*	100 *18*	3153.72	2$^+$			E_γ: from (n,γ) E=th. Other: 1114.6 *1* from ^{64}Co β^- decay. I_γ: from ^{64}Co β^- decay (0.30 s). Other: 100 *20* from (n,γ) E=th.
		2922.08 *9*	10.8 *11*	1345.777	2$^+$			E_γ: weighted average of 2922.1 *1* from ^{64}Co β^- decay (0.30 s) and 2922.07 *9* from (n,γ) E=th. I_γ: from (n,γ) E=th. Other: <21.7 from ^{64}Co β^- decay.
4346		1736$^{\#}$		2610.04	4$^+$			
4397		2120$^{\#}$		2276.58	2$^+$			
4417.6	(0$^+$ to 4$^+$)	2141.0 *3*	100	2276.58	2$^+$			
4453		2176$^{\#}$		2276.58	2$^+$			
4477.1	(6$^+$)	1311.3 *4*	100	3165.81	4$^+$			
4531.91	7$^-$	359.4 *1*	100	4172.53	6$^{(-)}$	(M1)	0.00186	E_γ: other: 359.4 *2* from ^{208}Pb(^{64}Ni,^{64}Ni$'\gamma$). Mult.: D or D+Q with ΔJ=1 from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,^{64}Ni$'\gamma$); M1 is most likely.
4556.4	(0$^+$,1$^+$,2$^+$)	3210.5 *4*	100	1345.777	2$^+$			E_γ: from ^{64}Co β^- decay.
4573.16	2$^+$	1963$^{\#}$		2610.04	4$^+$			
		2297$^{\#}$		2276.58	2$^+$			
		3227.31‡ *6*	100‡ *5*	1345.777	2$^+$			
		4572.94‡ *9*	49.8‡ *25*	0.0	0$^+$			
4615.57	(1,2)	2339.17 *12*	75 *9*	2276.58	2$^+$			
		4615.27 *9*	100 *5*	0.0	0$^+$			

$^{64}_{28}$Ni$_{36}$-14

$\gamma(^{64}Ni)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.	α&	Comments
4640.66	2^+	3294.90‡ *7*	69.2‡ *34*	1345.777	2^+	[M1,E2]	0.00088 *6*	B(M1)(W.u.)=0.0097 *+4−5*; B(E2)(W.u.)=1.51 *8* B(M1)(W.u.) for pure M1; B(E2)(W.u.) for pure E2.
		4640.34‡ *8*	100‡ *5*	0.0	0^+	[E2]	1.40×10^{-3}	B(E2)(W.u.)=0.394 *+13−16*
4704.12	0^+	2427.50‡ *9*	63‡ *7*	2276.58	2^+			
		3358.24‡ *6*	100‡ *5*	1345.777	2^+			
4711.99	(6^-)	626.8 *3*	27 *18*	4085.07	$5^{(-)}$			
		862.9 *2*	100 *18*	3849.13	5^-			
4719	4^+	3373#		1345.777	2^+			
4759	(1,2)	3413#		1345.777	2^+			
		4759#		0.0	0^+			
4868.54	(1,2)	3522.66‡ *6*	100‡ *5*	1345.777	2^+			
		4868.34‡ *11*	3.43‡ *16*	0.0	0^+			
4928		3582#		1345.777	2^+			
4962.2	$(6^-,7^-,8^-)$	430.3 *6*	100	4531.91	7^-			
4963	$(0^+$ to $4^+)$	3617#		1345.777	2^+			
4991	2^+	3645#		1345.777	2^+			
5093	4^+	696#		4397				
		3747#		1345.777	2^+			
5155.56	$(0^+,1,2,3^-)$	2878.94‡ *8*	83‡ *9*	2276.58	2^+			
		3809.64‡ *9*	100‡ *5*	1345.777	2^+			
5215	4^+	2938#		2276.58	2^+			
		3869#		1345.777	2^+			
5285	$(2^+,3,4^+)$	2675#		2610.04	4^+			
		3939#		1345.777	2^+			
5383	$(0^+$ to $4^+)$	3106#		2276.58	2^+			
		4037#		1345.777	2^+			
5418.21	$(1)^-$	4072.32‡ *9*	100‡ *5*	1345.777	2^+			
		5417.92‡ *12*	96‡ *5*	0.0	0^+			
5484	(3^-)	3207#		2276.58	2^+			
		4138#		1345.777	2^+			
5735.8	(7^-)	1204.1 *3*	100 *40*	4531.91	7^-			
		1562.8 *4*	80 *40*	4172.53	$6^{(-)}$			
5768.75	0^+	3492.33‡ *11*	82‡ *4*	2276.58	2^+			
		4422.60‡ *10*	100‡ *5*	1345.777	2^+			

$^{64}_{28}Ni_{36}$-15

Adopted Levels, Gammas (continued)

$\gamma(^{64}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.	α[&]	Comments
5812.0	8^+	1280.1 *2*	100	4531.91	7^-	(E1)	1.71×10^{-4}	E_γ: weighted average of 1280.4 *5* from $^{208}Pb(^{64}Ni,^{64}Ni'\gamma)$ and 1280.0 *2* from $^{238}U(^{64}Ni,^{64}Ni'\gamma)$. Mult.: D or D+Q from $\gamma\gamma(\theta)$ in $^{238}U(^{64}Ni,^{64}Ni'\gamma)$; E1 from level scheme.
6188.7	$9^{(-)}$	1656.8 *3*	100	4531.91	7^-	(E2)	2.33×10^{-4}	Mult.: Q from $\gamma\gamma(\theta)$ in $^{238}U(^{64}Ni,^{64}Ni'\gamma)$; E2 is more likely.
6444	$(1,2)^+$	6444[#]		0.0	0^+			
6796.0	(10^+)	984.0 *4*	100	5812.0	8^+			
7020	(1,2)	7020[#]		0.0	0^+			
7220	(1,2)	7220[#]		0.0	0^+			
7730	(1,2)	7730[#]		0.0	0^+			
8240	(1,2)	8240[#]		0.0	0^+			

[†] From $^{238}U(^{64}Ni,^{64}Ni'\gamma)$, unless otherwise noted.

[‡] From (n,γ) E=th.

[#] γ from (p,p$'\gamma$) only, shown in the level scheme by 1969Be20, where the measured γ-ray energies were not listed. The energy here is deduced from level-energy difference. This value is considered as approximate and may deviate by as much as 15 keV from that quoted in (p,p$'\gamma$) dataset.

[@] 2020Ma37 in (n,γ) E=th states that $\gamma\gamma(\theta)$ of the cascade toward 1346 level indicates a dominant M1 character, with only a small E2 admixture.

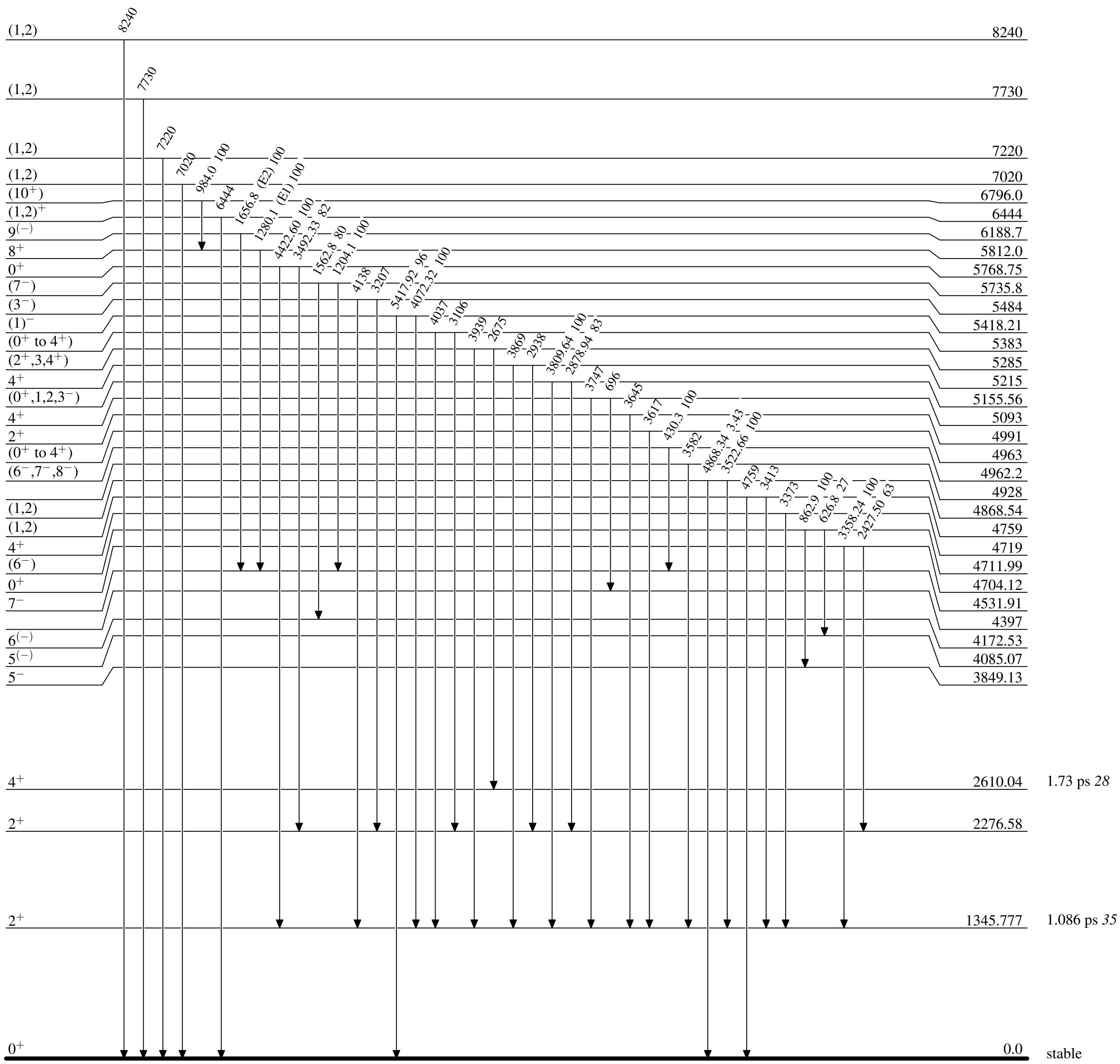
[&] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

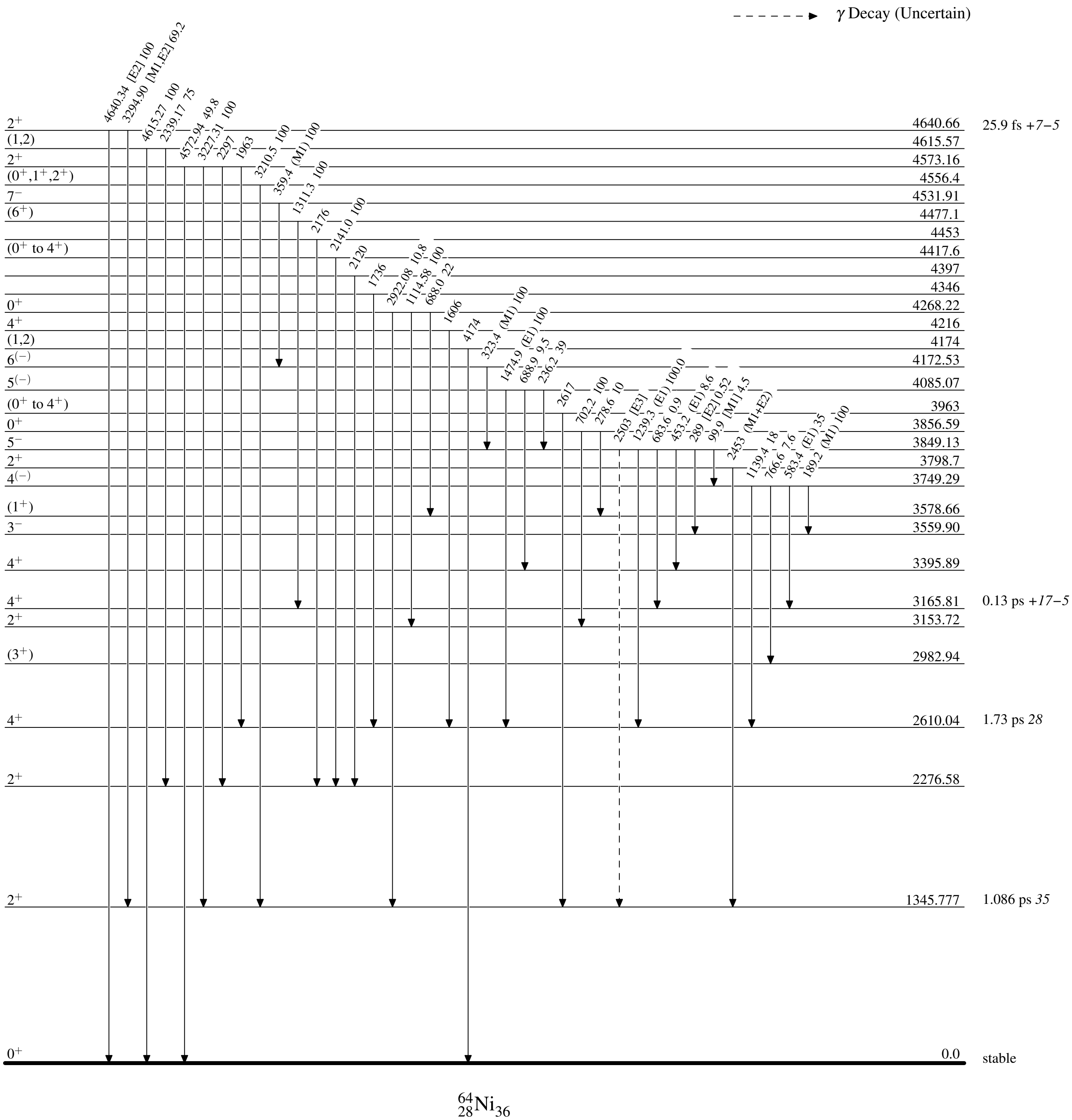


$^{64}_{28}Ni_{36}$

Adopted Levels, Gammas

Level Scheme (continued)

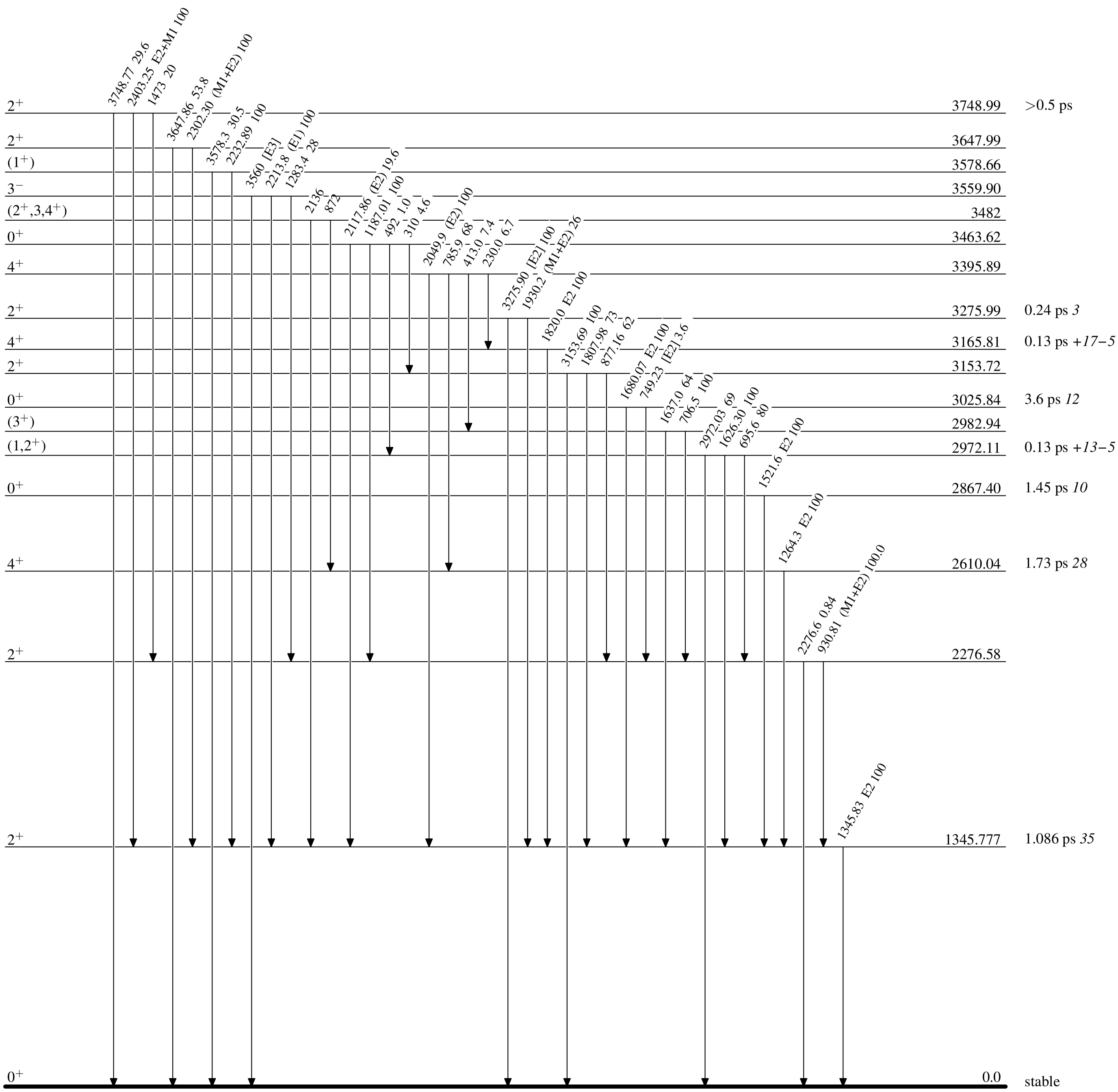
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{64}_{28}Ni_{36}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 111,1093 (2010)	3-Mar-2009

Q(β^-)=251.8 *16*; S(n)=8952.4 *15*; S(p)=14110 *3*; Q(α)=−9553 *4* 2012Wa38
Note: Current evaluation has used the following Q record 251.9 16 *8951.9 1514125* 13-9531 15 2009AuZZ,2003Au03.

^{66}Ni Levels

Configuration: Listed configurations are those expected in this region, and were used in DWBA analysis of (α,^{2}He) data.

Cross Reference (XREF) Flags

A	^{66}Co β^- decay	D	^{64}Ni(α,^{2}He)
B	^{64}Ni(t,p)	E	(HI,xnγ)
C	^{68}Zn(^{14}C,^{16}O)		

E(level)[†]	J$^\pi$[@]	T$_{1/2}$	XREF	Comments
0	0$^+$	54.6 h *3*	ABCDE	%β^-=100 Configuration=(ν f$_{5/2}$0$^+$) T$_{1/2}$: from ^{66}Ni β^- decay, weighted average of 55.1 h *10* (1956Jo20), 54.8 h *3* (1956Kj07), and 53.5 h *7* (1956Ru45).
1424.8[‡] *10*	2$^+$	0.8 ps *2*	ABC E	T$_{1/2}$: Deduced by evaluators from B(E2)↑=600 *200* (2002So03).
2445[‡] *1*	0$^+$		AB	
2664 *10*	(0$^+$)		B	
2670.8[‡] *13*	(3$^+$)		A E	J$^\pi$: from log *ft*=4.2 for β^- decay from (3$^+$).
2916[‡] *1*	2$^+$		AB	
2965 *10*	0$^+$		B	
3185.44[#] *15*	(4$^+$)		B E	
3230.6 *3*	2$^+$		AB	XREF: B(3219). J$^\pi$: From log *ft*=4.9 for β^- decay from (3$^+$).
3370.9[#] *4*	3$^-$		B E	
3390 *50*	(5$^-$)		D	Configuration=((ν p$_{1/2}$)(ν g$_{9/2}$))5$^-$ J$^\pi$: L(α,^{2}He)=(5).
3541.34[#] *18*			B E	J$^\pi$: (4$^+$) from L(t,p)=(4) disagrees with (5$^-$) yrast state in (HI,xnγ) suggested from analogy with ^{64}Ni.
3599.3[#] *6*	(6$^-$)[&]	4.3 ns *4*	B E	T$_{1/2}$: from (HI,xnγ) (1994Pa20).
3646 *10*			B	
3678 *10*	3$^-$		B	
3725.2[#] *6*			B E	
3746 *10*	2$^+$		B	
3782 *10*			B	
4028 *10*			B d	
4070.4[#] *7*			B dE	
4089.4[#] *6*	7$^-$		B dE	Configuration=((ν f$_{5/2}$)(ν g$_{9/2}$))7$^-$ J$^\pi$: L(α,^{2}He)=7 for a level at 4050 *50*.
4125 *10*	(4$^+$)		B	
4407 *10*			B	
4500 *10*			B	
4655 *10*			B	
4696 *10*			B	
4738 *10*			B d	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{66}Ni Levels (continued)

E(level)[†]	J^{π}[@]	XREF	Comments
4760 *50*	(5^-)	d	Configuration=((ν $f_{5/2}$)(ν $d_{5/2}$))5^- J^{π}: L(α,^{2}He)=(5). At the largest angle measured, this level could not be separated clearly from the 5170 level with a dominant configuration=(ν $g_{9/2}$)$^{+2}_{8+}$.
4796 *10*		B d	
4919 *10*		B	
4967 *10*		B	
5109 *10*		B	
5157 *10*		B d	
5174.9[#] *7*	$(8)^+$	dE	Configuration=((ν $G_{9/2}$)$^{+2}_{8+}$+(ν $G_{9/2}$)(ν $d_{5/2}$)6^+) J^{π}: L(α,^{2}He)=8+6 for an unresolved doublet at 5170 *50*; (8^+) in (HI,xnγ).
5192 *10*		B d	
5237 *10*		B	
5260 *10*		B	
5327 *10*		B	
5368 *10*		B	
5503 *10*		B	
5584 *10*		B	
5612 *10*		B	
5660 *10*		B	
5745 *10*		B	
5787 *10*		B	
5836 *10*		B	
5885 *10*		B	
6004 *10*		B	
6027 *10*		B	
6074 *10*		B	
6122 *10*		B	
6166 *10*		B	
6217 *10*		B	
6267 *10*		B	
6304 *10*		B	
6339 *10*		B	
6384 *10*		B	
6457 *10*		B	
6525 *10*		B	
6556 *10*		B	
6579.8[#] *9*	(10^+)[&]	E	
6600 *10*		B	
6665 *10*		B	
6730 *10*		B	

† From ^{64}Ni(t,p), except as stated.
‡ From ^{66}Co β^- decay.
# From (HI,xnγ).
@ From deduced L values in ^{64}Ni(t,p) with the assumption that the spins of the transferred neutrons couple to S=0, except as stated otherwise.
& From (HI,xnγ) based on level systematics and shell model calculations.

Adopted Levels, Gammas (continued)

$\gamma(^{66}Ni)$

E_i(level)	J^π_i	E_γ †	I_γ ‡	E_f	J^π_f
1424.8	2^+	1424.8 *10*	100	0	0^+
2445	0^+	1020# *1*	100	1424.8	2^+
2670.8	(3^+)	1246.0 *9*	100	1424.8	2^+
2916	2^+	471.3 *6*	100	2445	0^+
3185.44	(4^+)	1760.3 *1*	100	1424.8	2^+
3370.9	3^-	1945.8 *3*	100	1424.8	2^+
3541.34		355.9 *1*	100	3185.44	(4^+)
3599.3	(6^-)	58.0 *5*	100	3541.34	
3725.2		354.3 *5*	100	3370.9	3^-
4070.4		471.1 *4*	100	3599.3	(6^-)
4089.4	7^-	490.1 *2*	100	3599.3	(6^-)
5174.9	$(8)^+$	1085.5 *3*	100	4089.4	7^-
6579.8	(10^+)	1404.8 *6*	100	5174.9	$(8)^+$

† From ^{66}Co β^- decay and (HI,xnγ).

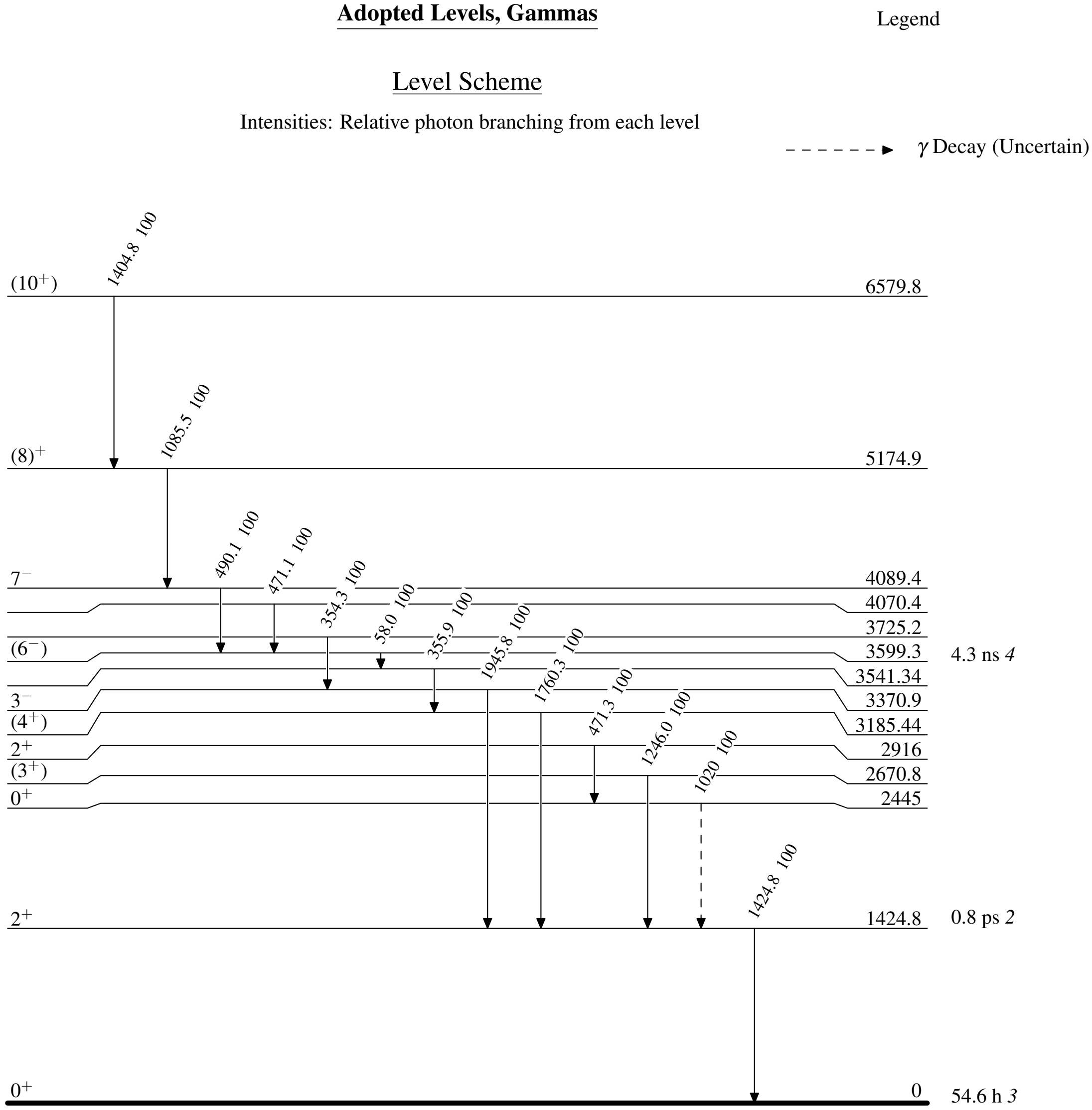
‡ Relative photon branching from each level.

Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{66}_{28}Ni_{38}$