Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 191,1 (2023)	22-Aug-2023

Q(β^-)=−3060 *40*; S(n)=7068 *8*; S(p)=5992 *12*; Q(α)=2153 *6* 2021Wa16
Q(ε)=1953 *4*, S(2n)=16437 *27*, S(2p)=10646 *4* (2021Wa16).

^{167}Yb activity produced and identified by 1954Ha16 in bombardment of Tm_2O_3 by 24-MeV protons from ORNL 86" cyclotron, followed by chemical separation using an ion-exchange column. Measured γ-ray spectrum using NaI(Tl) detector and determined half-life of 18.5 min for the decay of ^{167}Yb.

2008St17, 2005St03, 2002St12: ^{124}Sn(^{48}Ca,γ)^{172}Yb*,E(^{48}Ca)=215 MeV. Measured continuum γ and $\gamma\gamma$-coin spectra to investigate damping, motional narrowing, and chaos in rotational nuclei of ^{166}Yb, ^{167}Yb and ^{168}Yb populated with respective yields of 20%, 40% and 40% in high-spin regime (J=30-55) in neutron evaporation of the compound nucleus ^{172}Yb using Gammasphere array at ATLAS-ANL facility. Deduced damping width, spreading width, rotational damping width, and narrowing probabilities. Comparison with theoretical predictions. Relevance to order-to-chaos transition in Yb nuclei.

Additional information 1.

1982Bu21, 1983Ne13: measured optical hyperfine structure and isotope-shifts.

Theoretical structure calculations:

2011Gu18: calculated binding energy, levels, J^π, mass differences using Nilsson mean-field plus the extended pairing model.

2011Hu07: calculated moments of inertia, Nilsson levels, J^π.

2005Pa21, 2004Pa09: calculated binding energy, even-odd mass differences, using mean-field plus extended pairing model with several interactions.

1996Ly05, 1995Ly04: calculated levels, J^π, rotational band configurations using quasiparticle-rotational coupling model.

1993Ha11: calculated levels, J^π, B(λ), Eγ; octupole softness using one-quasiparticle coupled to axially symmetric rotor.

1989Zh01, 1986Zh01: analyzed rapidly rotating nuclei configurations, configuration space routhians; deduced diabolical points feature.

1987Ch12, 1985Ch21: calculated μ, gyromagnetic factors, levels, J^π, B(λ), γ-branching ratios using core-quasiparticle coupling model with quadrupole-quadrupole plus hexadecapole-hexadecapole interaction.

1986Br02, 1985Br28: calculated Routhians, crossing frequencies; role of pairing fluctuations in strongly rotating nuclei using RPA.

1985Mu12: calculated B(M1) using quasiparticle-rotor model, with rotation dependent interaction.

1984Ha47: calculated levels, J^π using microscopic model, angular momentum projection, and particle number conservation.

1984Ma22: calculated levels, J^π, band structure using generalized particle plus rotor model, with nonadiabatic effects.

1982Ch12: calculated levels, J^π, B(λ) using quasiparticle plus rotor model.

1982Ch30: calculated M1 quasicontinuum γ-spectra using core-quasiparticle coupling models.

1982Ro08, 1981Ga14: calculated two-, three-quasineutron routhians, yrast band angular frequencies using cranked shell model.

1981Kv02: calculated levels, J^π, B(λ), μ, rotational bands using quasiparticle-phonon model, with Coriolis interaction.

1980Al01: calculated spin alignment using particle-rotor, cranking models.

1979Be36: analyzed yrast spectra; deduced signature α, parity of observed bands using quasiparticle configuration, and deformed rotating field of angular frequencies.

Other theory references for structure: 38 references retrieved from the NSR database are listed in this dataset as 'document' records.

^{167}Yb Levels

Cross Reference (XREF) Flags

A	^{167}Lu ε decay (51.46 min)	D	^{166}Er(α,3nγ)
B	^{124}Sn(^{48}Ca,5nγ)	E	^{168}Yb(d,t)
C	^{154}Sm(^{17}O,4nγ),(^{18}O,5nγ)		

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	XREF	Comments
0.0[@]	5/2$^-$	17.5 min *2*	ABCDE	%ε+%β^+=100 μ=+0.621 *8* (1983Ne13,2019StZV) Q=+2.70 *4* (1983Ne13,2016St14,2021StZZ)

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Adopted Levels, Gammas (continued)

^{167}Yb Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	Comments
				Evaluated rms charge radius=5.2621 fm *56* (2013An02). Evaluated δ<r^2>(^{176}Yb,^{167}Yb)=−0.6252 fm^2 *3* (2013An02). μ,Q: collinear fast-beam laser spectroscopy (1983Ne13). Value of μ=0.623 *8* in 1983Ne13 is re-evaluated by 2019StZV. J^{π}: spin from collinear fast-beam laser spectroscopy (1982Bu21,1983Ne13); parity from log *ft*=4.63 to 7/2$^-$, 293 Level in ^{167}Tm; μ consistent only with 5/2[523] Nilsson-orbital assignment (1983Ne13). $T_{1/2}$: average of 17.6 min *5* (1972Ch23), 17.3 min *2* (1964Wa04), 17.7 min *2* (1960Wi15). Others: 1960Ba30, 1958Ar59, 18.5 min (1954Ha16, γ-decay curve).
29.656[a] *8*	5/2$^+$	<14 ns	ABCDe	J^{π}: 30γ E1 to 5/2$^-$; relative cross sections for 30, 59 and 186 levels in ^{168}Yb(d,t) fit Nilsson-model predictions for 5/2, 9/2 and 13/2 members of 5/2[642] band. $T_{1/2}$: $\gamma\gamma$(t) in ^{167}Lu ε decay (1976Me06). Others: ≤20 ns ($\gamma\gamma$(t), 1976Gr06), ≈400 ns ($\gamma\gamma$(t), 1975Bu10).
33.916[b] *8*	7/2$^+$	<16 ns	ABCDe	J^{π}: 34γ E1 to 5/2$^-$; 25γ M1+E2 from 9/2$^+$. $T_{1/2}$: from $\gamma\gamma$(t) in ^{167}Lu ε decay (1976Me06).
58.540[a] *9*	9/2$^+$		ABCDE	J^{π}: 29γ E2 to 5/2$^+$; relative cross sections for 30, 59 and 186 levels in ^{168}Yb(d,t) fit Nilsson-model predictions for 5/2, 9/2 and 13/2 members of 5/2[642] band.
78.679[&] *10*	7/2$^-$	0.84 ns *4*	ABCDE	J^{π}: 20γ E1 to 9/2$^+$, 49γ E1 to 5/2$^+$; relative cross sections for 0.0, 79 and 179 levels in (d,t) fit Nilsson-model predictions for 5/2, 7/2, and 9/2 members of 5/2[523] band. $T_{1/2}$: from ceγ(t) in ^{167}Lu ε decay (1975VaYV).
125.917[b] *20*	11/2$^+$		ABCD	J^{π}: 68γ M1+E2 to 9/2$^+$; band assignment. However, 11/2$^+$ is not consistent with apparent feeding in ^{167}Lu ε decay.
178.857[@] *13*	9/2$^-$	≤0.23 ns	ABCDe	XREF: e(187). J^{π}: 179γ E2 to 5/2$^-$, 120γ E1 to 9/2$^+$; band assignment. $T_{1/2}$: from ceγ(t) in ^{167}Lu ε decay (1975VaYV).
179.754[d] *21*	(3/2$^-$)		A e	XREF: e(187). J^{π}: 180γ to 5/2$^-$ g.s.; 3/2$^-$ consistent with band assignment.
185.97[a] *5*	13/2$^+$		ABCD	J^{π}: 127γ ΔJ=2 to 9/2$^+$; band assignment. See also comment with 29.7 level.
188.694[c] *21*	1/2$^-$	≈23 ns	A E	XREF: E(212). J^{π}: 189γ E2 to 5/2$^-$ g.s.; E(level) and decoupling parameter fit expectations for 1/2[521] band. $T_{1/2}$: from $\gamma\gamma$(t) in ^{167}Lu ε decay (1976Gr06).
213.172[j] *16*	(5/2)$^-$		A	J^{π}: 213γ M1 to 5/2$^-$ g.s.; band assignment.
239.168[d] *13*	(5/2)$^-$		A	J^{π}: 239γ M1+E2 to 5/2$^-$, 59γ (M1) to (3/2$^-$); 205γ to 7/2$^+$; band assignment.
258.519[c] *18*	3/2$^-$		A E	J^{π}: 70γ M1+E2 to 1/2$^-$, 259γ M1(+E2) to 5/2$^-$.
278.194[c] *19*	5/2$^-$		A E	J^{π}: 89γ E2 to 1/2$^-$; E(level) and decoupling parameter fit expectations for 1/2[521] band.
301.48[&] *3*	11/2$^-$		AB	J^{π}: 243γ E1+M2 to 9/2$^+$ 59, 223γ E2 to 7/2$^-$; level energy consistent with its being 11/2 member of 5/2[523] band.
308.405[j] *14*	(7/2)$^-$		A	J^{π}: 308γ M1 to 5/2$^-$, 230γ M1+E2 to 7/2$^-$; band assignment.
317.500[d] *16*	(7/2)$^-$		A E	J^{π}: 318γ M1(+E2) 5/2$^-$ g.s., 239γ M1 to 7/2$^-$; band assignment.
330.18[b] *7*	15/2$^+$	60.9 ps *63*	BCD	J^{π}: 204γ E2, ΔJ=2 to 11/2$^+$, 144γ D+Q to 13/2$^+$.
407.71[a] *8*	17/2$^+$	21.3 ps *17*	BCD	J^{π}: 222γ E2, ΔJ=2 to 13/2$^+$; 78γ D+Q to 15/2$^+$.
410.989 *17*	7/2$^-$		A e	XREF: e(408). J^{π}: 232γ M1(+E2) to 9/2$^-$, 411γ M1+E2 to 5/2$^-$.
419.580[d] *16*	(9/2)$^-$		A e	XREF: e(408). J^{π}: 341γ M1(+E2) 341γ to 7/2$^-$, 241γ M1 to 9/2$^-$, 180γ E2 to (5/2)$^-$; band

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Adopted Levels, Gammas (continued)

^{167}Yb Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
				assignment.
430.87 *5*	7/2+		A	Jπ: 373γ M1 to 9/2+, 401γ M1(+E2) to 5/2+.
440.656[c] *15*	7/2−		A e	XREF: e(408). Jπ: 262γ M1(+E2) to 9/2−, 182γ E2 to 3/2−. E(level) and decoupling parameter fit expectations for 1/2[521] band.
442.45[@] *9*	13/2−	27.9 ps *35*	BCD	Jπ: 264γ E2, ΔJ=2 to 9/2−; 317γ D+Q to 11/2+.
477.275[c] *20*	9/2−		A E	XREF: E(?). Jπ: 199γ E2 to 5/2−, 299γ M1(+E2) to 9/2−; nuclear orientation results consistent only with J=9/2 (1981Kr08); E(level) and decoupling parameter fit expectations for 1/2[521] band.
553.42 *3*	9/2−		A E	XREF: E(545?). E(level): uncertain 545 *3* level in (d,t) may be different from the 553 level, if proven to be correct. Jπ: 236γ,M1+E2, 318γ,M1(+E2) cascade to 5/2− g.s., 427γ D(+Q) to 11/2+.
569.40 *10*	(7/2)+		A E	XREF: E(566). Jπ: 356γ E1 to (5/2)−; possible 443γ to 11/2+.
571.511[g] *19*	(11/2)−	≈180 ns	AB D	Jπ: 393γ M1+E2 393γ to 9/2−, 446γ E1(+M2) 446γ to 11/2+; doubly-placed 386γ (E1) to 13/2+. $T_{1/2}$: from γγ(t) in ^{167}Lu ε decay (1976Gr06).
607.3[&] *6*	(15/2−)		B E	XREF: E(601?). E(level): uncertain 601 *3* level in (d,t) may be different from the 607 level, if proven to be correct.
614 *3*			E	
628.61 *6*	7/2+		A	Jπ: 570γ M1(+E2) to 9/2+, 599γ M1+E2 to 5/2+.
644.43[b] *10*	19/2+	9.1 ps *17*	BCD	Jπ: 314γ E2, ΔJ=2 to 15/2+; 237γ D+Q to 17/2+.
660 *3*			E	
677.19 *6*	(5/2,7/2)−		A E	XREF: E(692?). E(level): uncertain 692 *3* level in (d,t) may be different from the 677 level, if proven to be correct. Jπ: 438γ M1 to (5/2)−; 1275γ E1(+M2) from (7/2)+.
719.62 *10*	(7/2)−		A	Jπ: 720γ E2(+M1) to 5/2−; 1227γ D+Q from (9/2)+.
721.33[a] *12*	(21/2+)	5.0 ps *15*	BCD	Jπ: 313.6γ (E2), ΔJ=(2) to 17/2+; 76.9γ D+Q, ΔJ=1 to 19/2+.
726.50[f] *10*	(13/2−)		B D	
752 *3*			E	
783.83[@] *13*	17/2−	7.0 ps *22*	BCD	Jπ: 341.4γ E2, ΔJ=2 to 13/2−; band assignment.
788.38 *6*	(9/2)−		A E	XREF: E(801?). E(level): uncertain 801 *3* level in (d,t) may be different from the 788 level, if proven to be correct. Jπ: 549γ E2(+M3) to (5/2)−, 788γ E2 to 5/2−, 609γ E2(+M1) to 9/2−.
835 *3*			E	
901.39[g] *13*	(15/2−)		B D	Jπ: 174.9γ E2 to (13/2−); band assignment.
966 *3*			E	
987.4[&] *7*	(19/2−)		B	
1022.27 *7*	(5/2,9/2)+		A	Jπ: 591γ M1+E2 to 7/2+, ΔJ>0.
1061.20[b] *13*	23/2+	2.70 ps *49*	BCD	Jπ: 417γ E2, ΔJ=2 to 19/2+, 339γ D+Q to (21/2+); band assignment.
1094.65[f] *20*	(17/2−)		B D	
1122.14[a] *19*	(25/2+)	2.29 ps *42*	BCD	Jπ: 401γ E2, ΔJ=2 to (21/2+); band assignment.
1193.22[@] *15*	(21/2−)	2.84 ps *56*	BCD	
1267.24 *6*	5/2+		A	Jπ: 1267γ E1 to 5/2− g.s., 1189γ E1(+M2) to 7/2−; nuclear orientation results exclude J=7/2 (1981Kr08).
1304.92[g] *23*	(19/2)−		B D	Jπ: 210γ E2+M1 to (17/2−); band assignment.
1305.53 *7*	(7/2−)		A	Jπ: 1127γ D(+Q) to 9/2−; 1305γ (M1+E2) to 5/2− g.s. (E1) 677γ to

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Adopted Levels, Gammas (continued)

^{167}Yb Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
			π=+ 628.
1356.34 *8*	(9/2+,11/2+)	A	J$^{\pi}$: 785γ (E1) to (11/2)− 572; 1323γ to 7/2+.
1433.1[&] *7*	(23/2−)	B	
1531.0[f] *3*	(21/2−)	B D	
1570.03[b] *15*	(27/2+)	BCD	J$^{\pi}$: 509γ (E2) to 23/2+; 448γ D+Q to (25/2+); band assignment.
1601.81[a] *25*	(29/2+)	BCD	J$^{\pi}$: 480γ (E2) to (25/2+); band assignment.
1657.12[@] *21*	(25/2−)	BCD	J$^{\pi}$: 464γ (E2) to (21/2−); band assignment.
1771.6[g] *3*	(23/2−)	B	
1895.3[e] *8*	(27/2−)	B	
1934.7[&] *7*	(27/2−)	B	
1947.46 *6*	(9/2)+	A	J$^{\pi}$: 1507γ E1+M2 to 7/2−, 1376γ D+Q to (11/2)−.
1951.12 *6*	(9/2)	A	J$^{\pi}$: 1510γ D+Q to 7/2−, 1918γ D(+Q) to 7/2+, 1825γ to 11/2+, 1951γ to 5/2−, and 1380γ to (11/2)− gives J$^{\pi}$=(9/2−); π=− is also favored by magnitude of δ for 1398γ to 9/2− 553; however, π=+ is implied by α(K)exp for 1510γ, 1634γ and probably 1398γ, and log *ft*=5.90 *6* from 7/2+ parent is somewhat low for a first-forbidden transition.
1952.68 *6*	(7/2)+	A	J$^{\pi}$: 1873γ (E1) to 7/2−, 1714γ E1 to (5/2)−, 1893γ to 9/2+; nuclear orientation results for 1873γ exclude pure D, ΔJ=1 to 7/2− (1981Kr08).
1973.97 *9*	5/2,7/2	A	J$^{\pi}$: 1895γ D(+Q) to 7/2−, 1696γ D(+Q) to 5/2−.
1975.17 *8*	(9/2)+	A	J$^{\pi}$: 1256γ E1+M2 to (7/2)−, 1404γ D(+Q) 1404γ to (11/2)−.
1979.49 *8*	(7/2−)	A	J$^{\pi}$: 1548γ D(+Q) 1548γ to 7/2+, 1980γ D+Q to 5/2−, 1921γ to 9/2+, 1801γ to 9/2−; magnitude of δ(1980γ) favors Δπ=no.
1995.32 *10*	(9/2−)	A	J$^{\pi}$: 1961γ D+Q to 7/2+, 1424γ to (11/2)−, 1996γ to 5/2−; nuclear orientation results disfavor 7/2− based on δ(1961γ) (1981Kr08).
1998.42 *6*	(9/2)+	A	J$^{\pi}$: 1427γ E1+M2 to (11/2)−, 1965γ D(+Q) to 7/2+; Δπ=no favored by δ for 1522γ to 9/2− and 1720γ to 5/2−; but π=+ based on α(K)exp for 1427γ; also, log *ft*=5.99 *6* from 7/2+ is somewhat low for a first-forbidden transition.
2012.27 *12*	(7/2,9/2−)	A	J$^{\pi}$: 1934γ (D+Q) to 7/2−, 1582γ to 7/2+, 1833γ to 9/2−, doubly-placed 1954γ to 9/2+ 59; δ(1934) favors Δπ=no if J=9/2.
2013.04 *13*	(7/2−)	A	J$^{\pi}$: 1982γ D(+Q) to 5/2+, 2013γ D+Q to 5/2−, doubly-placed 1954γ to 9/2+; magnitude of δ(2013γ) favors π=−.
2025.6[f] *3*	(25/2−)	B	
2052.80 *11*	9/2(−)	A	J$^{\pi}$: 1927γ D(+Q) to 11/2+; 1735γ, D+Q, 318γ, (M1+E2) cascade to 5/2−; 2052γ to 5/2− g.s. However, α(K)exp(1735γ) favors π=+.
2149.0[a] *3*	(33/2+)	BCD	
2158.92[@] *24*	(29/2−)	BCD	
2159.14[b] *22*	(31/2+)	BCD	
2292.6[g] *4*	(27/2−)	B	
2330.39 *7*	9/2+	A	J$^{\pi}$: 1702γ D+Q to 7/2+ 628, 2204γ D+Q to 11/2+ 126; 2204γ and 2272γ anisotropies exclude J=7/2; magnitudes of δ(1702) and δ(2204) favor (M1+E2) to 7/2+ and 11/2+; Δπ=no; log *ft*=5.76 *9* from 7/2+.
2359.4[e] *8*	(31/2−)	B	
2482.8[&] *7*	(31/2−)	B	
2571.6[f] *4*	(29/2−)	B	
2684.2[@] *3*	(33/2−)	BC	
2751.8[a] *3*	(37/2+)	BC	
2817.7[b] *4*	(35/2+)	BC	
2862.7[g] *4*	(31/2−)	B	
2882.2[e] *8*	(35/2−)	B	
3072.9[&] *8*	(35/2−)	B	
3164.8[f] *4*	(33/2−)	B	
3237.7[@] *4*	(37/2−)	BC	

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Adopted Levels, Gammas (continued)

^{167}Yb Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	E(level)[†]	J^{π}[‡]	XREF	E(level)[†]	J^{π}[‡]	XREF
3399.4[a] *4*	$(41/2^+)$	BC	5615.8?[g] *15*	$(47/2^-)$	B	8678.5[@] *15*	$(65/2^-)$	B
3460.2[e] *13*	$(39/2^-)$	B	5636.3[a] *14*	$(53/2^+)$	BC	8938[e] *3*	$(67/2^-)$	B
3481.2[g] *5*	$(35/2^-)$	B	5812.8[h] *8*	$(49/2^-)$	B	9523.2[a] *17*	$(69/2^+)$	B
3533.7[b] *4*	$(39/2^+)$	BC	5878.9[&] *22*	$(51/2^-)$	B	9540.1[b] *17*	$(67/2^+)$	B
3702.9[&] *13*	$(39/2^-)$	B	5919.4[b] *14*	$(51/2^+)$	B	9638[&] *3*	$(67/2^-)$	B
3807.3[f] *6*	$(37/2^-)$	B	5986.6[@] *12*	$(53/2^-)$	B	9711.5[@] *16*	$(69/2^-)$	B
3815.4?[h] *6*	$(37/2^-)$	B	6016.2?[f] *16*	$(49/2^-)$	B	9973[e] *3*	$(71/2^-)$	B
3838.3[@] *5*	$(41/2^-)$	BC	6178.8[i] *9*	$(51/2^-)$	B	10563.1[b] *18*	$(71/2^+)$	B
4078.2[e] *16*	$(43/2^-)$	B	6217.2[e] *24*	$(55/2^-)$	B	10648.5[a] *18*	$(73/2^+)$	B
4091.7[a] *6*	$(45/2^+)$	BC	6506.7[a] *15*	$(57/2^+)$	B	10714[&] *3*	$(71/2^-)$	B
4116.7[i] *6*	$(39/2^-)$	B	6553.0[h] *9*	$(53/2^-)$	B	10810.3[@] *16*	$(73/2^-)$	B
4141.7[g] *8*	$(39/2^-)$	B	6726.9[&] *24*	$(55/2^-)$	B	11053[e] *3*	$(75/2^-)$	B
4294.8[b] *12*	$(43/2^+)$	BC	6758.2[b] *15*	$(55/2^+)$	B	11640.6[b] *19*	$(75/2^+)$	B
4372.9[&] *16*	$(43/2^-)$	B	6818.7[@] *13*	$(57/2^-)$	B	11812.8[a] *18*	$(77/2^+)$	B
4434.4[h] *6*	$(41/2^-)$	B	6936.3[i] *10*	$(55/2^-)$	B	11967.9[@] *17*	$(77/2^-)$	B
4496.7[@] *10*	$(45/2^-)$	BC	7057[e] *3*	$(59/2^-)$	B	12763.6[b] *21*	$(79/2^+)$	B
4503.3?[f] *10*	$(41/2^-)$	B	7335.2[h] *13*	$(57/2^-)$	B	12989.6[a] *19*	$(81/2^+)$	B
4734.2[e] *19*	$(47/2^-)$	B	7445.9[a] *15*	$(61/2^+)$	B	13180.7[@] *18*	$(81/2^-)$	B
4764.5[i] *7*	$(43/2^-)$	B	7639.6[b] *16*	$(59/2^+)$	B	13886.6[b] *23*	$(83/2^+)$	B
4834.2[a] *8*	$(49/2^+)$	BC	7640[&] *3*	$(59/2^-)$	B	14172.3[a] *20*	$(85/2^+)$	B
4860.7[g] *11*	$(43/2^-)$	B	7714.3[@] *14*	$(61/2^-)$	B	14359.7[@] *20*	$(85/2^-)$	B
5094.2[b] *13*	$(47/2^+)$	B	7744.1[i] *13*	$(59/2^-)$	B	15051.0[b] *24*	$(87/2^+)$	B
5095.9[&] *19*	$(47/2^-)$	B	7965[e] *3*	$(63/2^-)$	B	15383.7[a] *20*	$(89/2^+)$	B
5106.2[h] *7*	$(45/2^-)$	B	8173.9?[h] *15*	$(61/2^-)$	B	15548.7[@] *23*	$(89/2^-)$	B
5213.2[@] *11*	$(49/2^-)$	BC	8452.7[a] *16*	$(65/2^+)$	B	16275[b] *3*	$(91/2^+)$	B
5234.0?[f] *13*	$(45/2^-)$	B	8568.1[b] *16*	$(63/2^+)$	B	16767.7[@] *25*	$(93/2^-)$	B
5444.2[e] *22*	$(51/2^-)$	B	8605.1?[i] *15*	$(63/2^-)$	B			
5454.2[i] *8*	$(47/2^-)$	B	8614[&] *3*	$(63/2^-)$	B			

[†] From a least-squares adjustment of Eγ, omitting all questionably- or multiply-placed γ rays and the 1873.02γ and 1893.3.0γ (from 1953 level), 1752.7γ (from 2053 level); the latter gammas do not fit their placements well.

[‡] Assignments given without comment are from band assignments.

[#] For excited stated, values are from Recoil-Distance Doppler-Shift (RDDS) method (2013Gl01) using Cologne plunger in ^{154}Sm(^{18}O,5nγ) reaction, and analyzed using Differential Decay Curve Method (DDCM), except where noted.

[@] Band(A): ν5/2[523],α=+1/2. Band assignment from 1995Fi01. A=11.4, B=−6.7 (5/2, 7/2, 9/2 levels).

[&] Band(a): ν5/2[523],α=−1/2. Band assignment from 1976Me06 and 1995Fi01. 1995Fi01 suggest ν3/2[521] or ν1/2[521] for this band, but none is compatible with earlier assignments (e.g. from 1971Ab04), for the low-J members of such bands. Note also that the 301 level, assigned by 1995Fi01 as the 11/2 member of this band, previously had been assigned (in 1976Gr06 and 1976Me06) as the 11/2 member of the ν5/2[523] band, as adopted here. Based on band parameters, the 11/2, ν1/2[521] and 11/2, ν3/2[521] levels would be expected at 730 and 540 keV, respectively. The 11/2 through 31/2 members of this band have energies very close to those of the ν5/2[523] band in the ^{169}Lu isotone, and the alignment appears to be consistent with this being the signature partner of the ν5/2[523],α=+1/2 band.

[a] Band(B): ν5/2[642],α=+1/2. Band assignment from 1995Fi01. Coriolis perturbed level spacing.

[b] Band(b): ν5/2[642],α=−1/2 (1995Fi01). Band assignment from 1995Fi01. Coriolis perturbed level spacing.

[c] Band(C): ν1/2[521]. Band assignment from 1971Ab04. A=13.6, a=+0.71 (1/2, 3/2, 5/2, 7/2 levels); note that values for ‘A’ and ‘a’ parameters are in agreement with those expected for a ν1/2[521] band. However, see comment with the π=−, α=−1/2 band

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{167}Yb Levels (continued)

regarding a possibly conflicting assignment of this configuration.

[d] Band(D): ν3/2[521]. Band assignment from 1971Ab04. A=11.8 (3/2 and 5/2 levels). However, see comment with the π=−, α=−1/2 band regarding a possibly conflicting assignment of this configuration.

[e] Band(E): Band based on (27/2$^-$),α=−1/2. Band assignment from 1995Fi01. Authors assigned ν5/2[523],α=−1/2 configuration, but see comment for a different band assigned as ν5/2[523],α=−1/2. Structure of this band may be analogous to that of one of the three-quasineutron bands known in the isotone ^{171}W, as no members of this band of J<27/2 have been reported.

[f] Band(F): ν11/2[505],α=+1/2. Band assignment from 1996Sm05, with possible band crossing at $\hbar\omega\approx$0.31 MeV due to a pair of $i_{13/2}$ neutrons A=12.7, B=−9.8 (11/2, 13/2, 15/2 levels).

[g] Band(f): ν11/2[505],α=−1/2. Band assignment from 1996Sm05, with possible band crossing at $\hbar\omega\approx$0.31 MeV due to a pair of $i_{13/2}$ neutrons.

[h] Band(G): 3-qp band based on (41/2$^-$),α=+1/2. Three−quasineutron assignment from 1996Sm05.

[i] Band(g): 3-qp band based on (43/2$^-$),α=−1/2. Three-quasineutron assignment from 1996Sm05.

[j] Band(H): Tentative ν5/2[512]. Band assignment from 1971Ab04. A=13.6.

$\gamma(^{167}Yb)$

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J$^\pi_f$	Mult.[‡]	δ[‡]	α[c]	Comments
29.656	5/2+	29.66 *1*	100	0.0	5/2−	E1		1.737 *24*	B(E1)(W.u.)>0.00022
33.916	7/2+	(4.251)	<0.3[b]	29.656	5/2+				E$_\gamma$: from energy difference between 29.7 and 33.9 levels.
		33.91 *1*	100	0.0	5/2−	E1		1.200 *17*	B(E1)(W.u.)>1.6×10^{-4}
58.540	9/2+	24.63 *1*	100[a]	33.916	7/2+	M1+E2	0.148 *3*	75.4 *20*	
		28.88 *1*	1.9[a]	29.656	5/2+	E2		893 *13*	
78.679	7/2−	20.19 *3*	≈5[a]	58.540	9/2+	E1		4.99 *7*	B(E1)(W.u.)=0.00014 +*12*−*8*
		44.77 *2*	83 *20*	33.916	7/2+	E1		0.556 *8*	B(E1)(W.u.)=0.00022 *5*
		49.02 *2*	26[a]	29.656	5/2+	E1		0.432 *6*	B(E1)(W.u.)=5.2×10^{-5} *13*
		78.67 *2*	100 *12*	0.0	5/2−	E2(+M1)	≥4.6	8.25 *12*	B(M1)(W.u.)<0.00025; B(E2)(W.u.)=3.5×10^2 +*7*−*4*
125.917	11/2+	67.37 *2*	100 *13*	58.540	9/2+	M1+E2	0.30 +*8*−*10*	10.95 *28*	Other Iγ: 100 *11* in (α,3nγ).
		92.05 *7*	42 *13*	33.916	7/2+	[E2]		4.43 *6*	Other Iγ: 18 *5* in (α,3nγ).
178.857	9/2−	100.22 *2*	13.1 *19*	78.679	7/2−	M1+E2	4.9 +*21*−*9*	3.19 *4*	B(M1)(W.u.)≥6.4×10^{-5}; B(E2)(W.u.)≥142
		120.31 *3*	38.6 *22*	58.540	9/2+	E1		0.2101 *29*	B(E1)(W.u.)≥5.9×10^{-5} I$_\gamma$: others: 57 *14* in (α,3nγ) and 69 *14* in (O,xnγ) are discrepant.
		144.97 *3*	67 *3*	33.916	7/2+	E1		0.1285 *18*	B(E1)(W.u.)≥6.0×10^{-5} I$_\gamma$: others: 86 *14* in (α,3nγ), 102 *20* in (O,xnγ).
		178.87 *4*	100 *11*	0.0	5/2−	E2		0.391 *5*	B(E2)(W.u.)≥69 I$_\gamma$: others: 100 *29* in (α,3nγ), 100 *20* in (O,xnγ).
179.754	(3/2−)	179.69[d] *4*	100[d]	0.0	5/2−				
185.97	13/2+	60.1 *2*	87 *9*	125.917	11/2+	[M1]		2.44 *4*	E$_\gamma$,I$_\gamma$: from (O,xnγ). Other: 60.0 *5* from (α,3nγ).
		127.40[#] *7*	100 *11*	58.540	9/2+	(E2)		1.296 *18*	I$_\gamma$,Mult.: from (O,xnγ), ΔJ=2; Mult=E2 from level scheme.
188.694	1/2−	188.66 *5*	100	0.0	5/2−	E2		0.327 *5*	B(E2)(W.u.)≈1.4
213.172	(5/2)−	183.61 *5*	≈4.7	29.656	5/2+	E1		0.0692 *10*	
		213.19 *4*	100 *6*	0.0	5/2−	M1		0.399 *6*	
239.168	(5/2)−	25.98 *2*	0.1[a]	213.172	(5/2)−	M1+E2	0.190 +*32*−*23*	81 *18*	
		59.40 *2*	0.5[a]	179.754	(3/2−)	(M1)		2.525 *35*	
		160.49[d] *2*	<4.5[d]	78.679	7/2−	(M1,E2)		0.72 *16*	
		205.40 *10*	5.8 *8*	33.916	7/2+	[E1]		0.0517 *7*	
		209.58 *10*	10.1 *15*	29.656	5/2+	[E1]		0.0491 *7*	
		239.22 *4*	100 *6*	0.0	5/2−	M1+E2	+2.9 +*15*−*9*	0.165 *13*	
258.519	3/2−	19.4 *1*	<0.03[b]	239.168	(5/2)−				
		45.35 *10*	<6.3[b]	213.172	(5/2)−				
		69.83 *2*	<2.2	188.694	1/2−	M1+E2	1.9 +*6*−*3*	12.7 *4*	
		179.69[d] *4*	<18[d]	78.679	7/2−	[E2]		0.385 *5*	
		258.54 *4*	100 *6*	0.0	5/2−	M1(+E2)	−1.2 *14*	0.17 *7*	

$^{167}_{70}Yb_{97}$-7

Adopted Levels, Gammas (continued)

γ(^{167}Yb) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[c]	Comments
278.194	5/2⁻	19.68 *2*	<0.03[b]	258.519	3/2⁻	[M1,E2]		3.0×10^3 *30*	
		89.49 *2*	13 *4*	188.694	1/2⁻	E2		4.94 *7*	
		248.64 *7*	100 *13*	29.656	5/2⁺	E1(+M2)	<0.10	0.038 *6*	
		278.2 *1*	96 *31*	0.0	5/2⁻	(M1,E2)		0.14 *5*	
301.48	11/2⁻	122.63 *4*	<9.6[b]	178.857	9/2⁻	(M1,E2)		1.69 *20*	
		222.79 *4*	100 *6*	78.679	7/2⁻	E2		0.1882 *26*	δ(O/Q)=+0.3 *+6−3* from ε decay.
		243.13 *15*	22 *7*	58.540	9/2⁺	E1+M2	≈+0.06	≈0.038	
308.405	(7/2)⁻	95.27 *2*	13.5 *26*	213.172	(5/2)⁻	M1+E2	0.16	3.88 *5*	
		229.78 *4*	57.6 *33*	78.679	7/2⁻	M1+E2	−0.39 *+20−24*	0.304 *24*	
		274.41 *2*	13.0 *22*	33.916	7/2⁺	(E1)		0.02482 *35*	
		278.9 *1*	100 *20*	29.656	5/2⁺	[E1]		0.02384 *33*	
		308.47 *8*	18.9 *20*	0.0	5/2⁻	M1		0.1460 *20*	
317.500	(7/2)⁻	39.33 *4*	<0.04[b]	278.194	5/2⁻	[M1,E2]		1.0×10^2 *9*	
		78.33 *2*	28 *9*	239.168	(5/2)⁻	M1+E2	0.15	6.86 *10*	
		138.7 *2*	9.4 *32*	178.857	9/2⁻	[M1,E2]		1.14 *19*	
		239.0 *1*	47 *24*	78.679	7/2⁻	M1		0.292 *4*	
		317.55 *10*	100 *7*	0.0	5/2⁻	M1(+E2)	−0.05 *13*	0.1349 *28*	
330.18	15/2⁺	144.2 *1*	52.2[&] *11*	185.97	13/2⁺	(M1+E2)		1.01 *18*	B(M1)(W.u.)=0.0274 *+35−28*; B(E2)(W.u.)=620 *+80−60* B(M1)(W.u.) for pure M1, and B(E2)(W.u.) for pure E2. E_γ,Mult.: from (α,3nγ), D+Q; M1+E2 from level scheme. I_γ: others: 60 *6* from (O,xnγ), 72 *8* from (α,3nγ).
		204.3 *1*	100[&] *3*	125.917	11/2⁺	E2		0.2502 *35*	B(E2)(W.u.)=208 *+26−21* E_γ,Mult.: from (α,3nγ), ΔJ=2; Mult=M2 ruled out by RUL. I_γ: others: 100 *10* from (O,xnγ) and (α,3nγ).
407.71	17/2⁺	77.5 *1*	27 *11*	330.18	15/2⁺	(M1)		7.03	B(M1)(W.u.)=0.167 *+27−35* E_γ,Mult.: from (α,3nγ), D+Q; M1+E2 from level scheme; E2 ruled out by RUL. I_γ: unweighted average of 15 *3* in (O,xnγ) and 39 *4* in (α,3nγ).
		221.7[@] *1*	100[@] *10*	185.97	13/2⁺	E2[@]		0.1912 *27*	B(E2)(W.u.)=2.5×10^2 *+10−6* Mult.: Q, ΔJ=2 from (α,3nγ); M2 ruled out by RUL.
410.989	7/2⁻	102.56 *2*	27 *6*	308.405	(7/2)⁻	M1+E2	0.22 *5*	3.13 *4*	
		197.80[d] *5*	<20[d]	213.172	(5/2)⁻	(E2)		0.279 *4*	
		232.12 *4*	18.5 *16*	178.857	9/2⁻	M1(+E2)	−1.4 *16*	0.22 *9*	
		332.36 *10*	18 *5*	78.679	7/2⁻	M1(+E2)	<1.5	0.097 *23*	

$^{167}_{70}$Yb$_{97}$-8

$\gamma(^{167}Yb)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[c]	Comments
410.989	7/2⁻	377.03 *9*	100 *8*	33.916	7/2⁺	E1+M2	≈+0.08	≈0.013	
		381.43 *15*	68 *7*	29.656	5/2⁺	E1		0.01120 *16*	
		410.96 *10*	80 *10*	0.0	5/2⁻	M1+E2	−3.1 *+14−49*	0.034 *6*	
419.580	(9/2)⁻	102.08 *2*	100 *23*	317.500	(7/2)⁻	M1+E2	0.17 *+5−6*	3.18 *4*	
		111.10 *5*	<18[b]	308.405	(7/2)⁻	[M1,E2]		2.32 *18*	
		180.34 *4*	91 *27*	239.168	(5/2)⁻	E2		0.381 *5*	
		240.8 *2*	46 *18*	178.857	9/2⁻	M1		0.286 *4*	
		340.90 *15*	96 *14*	78.679	7/2⁻	M1(+E2)	<0.7	0.102 *10*	
		385.55[d] *12*	<190[d]	33.916	7/2⁺	(E1)		0.01092 *15*	
430.87	7/2⁺	352.3 *2*	5.9 *5*	78.679	7/2⁻	(E1)		0.01351 *19*	
		372.5 *1*	10.2 *10*	58.540	9/2⁺	M1		0.0884 *12*	
		396.94 *10*	26.3 *26*	33.916	7/2⁺	M1+E2	−0.41 *+20−31*	0.069 *8*	
		401.15 *10*	100 *5*	29.656	5/2⁺	M1(+E2)	−0.02 *9*	0.0727 *11*	
440.656	7/2⁻	21.16 *3*	<0.3[b]	419.580	(9/2)⁻	M1+E2	0.10 *2*	94 *18*	
		123.19 *3*	29.8 *30*	317.500	(7/2)⁻	M1+E2	0.7 *5*	1.73 *12*	
		132.28 *4*	<2.9[b]	308.405	(7/2)⁻	[M1,E2]		1.32 *20*	
		162.42 *4*	2.3 *7*	278.194	5/2⁻	M1		0.851 *12*	
		182.07 *3*	100 *5*	258.519	3/2⁻	E2		0.369 *5*	
		201.56 *5*	5.0 *16*	239.168	(5/2)⁻	(E2)		0.262 *4*	
		261.85 *2*	63.6 *34*	178.857	9/2⁻	M1(+E2)	−0.06 *10*	0.227 *4*	
		361.82 *25*	25.5 *24*	78.679	7/2⁻	M1+E2	+1.6 *+21−6*	0.057 *12*	
		406.72 *10*	36 *4*	33.916	7/2⁺	E1(+M2)	≤0.11	0.0110 *14*	
442.45	13/2⁻	263.6[@] *1*	100[&] *5*	178.857	9/2⁻	E2		0.1100 *15*	B(E2)(W.u.)=202 *+29−23* E_γ: others: 263.4 *5* from (^{48}Ca,5nγ), 263.5 *3* from (O,xnγ). I_γ: others: 100 *9* from (α,3nγ), 100 *15* from (O,xnγ). Mult.: α(K)exp in ^{154}Sm(^{16}O,3ne$^-$) (2019Sm01); see details listed in ^{124}Sn(^{48}Ca,5nγ) dataset; Q, ΔJ=2 from (α,3nγ) and (O,xnγ).
		316.6[#] *3*	32.8[&] *17*	125.917	11/2⁺	(E1)		0.0175	B(E1)(W.u.)=5.7×10^{-5} *+9−7* E_γ: others: 316.6 *5* from (^{48}Ca,5nγ), 316.8 *5* from (α,3nγ). I_γ: others: 55 *9* from (α,3nγ), 97 *15* from (O,xnγ). Mult.: D+Q from (O,xnγ); E1+M2 from level scheme; M2 ruled out by RUL.
477.275	9/2⁻	36.79 *3*	≤5.7	440.656	7/2⁻	M1+E2	0.10 *+4−6*	12.9 *24*	
		57.60[e] *2*	<6[b]	419.580	(9/2)⁻	[M1,E2]		16 *14*	Eγ fits this placement poorly.
		199.12 *5*	100 *13*	278.194	5/2⁻	E2		0.273 *4*	
		298.6 *1*	39 *10*	178.857	9/2⁻	M1(+E2)	+0.4 *5*	0.15 *3*	

$^{167}_{70}Yb_{97}$-9

Adopted Levels, Gammas (continued)

$\gamma(^{167}\mathrm{Yb})$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[†]	E_f	J^{π}_f	Mult.[‡]	δ[‡]	α[c]	Comments
477.275	9/2⁻	398.83[d] *15*	<54[d]	78.679	7/2⁻	[M1,E2]		0.053 *21*	
		443.0[d] *9*	<26[d]	33.916	7/2⁺				
		477.32 *35*	8.7 *26*	0.0	5/2⁻				
553.42	9/2⁻	133.84 *3*	46 *7*	419.580	(9/2)⁻	M1(+E2)	<0.09	1.468 *21*	
		235.9 *4*	100 *13*	317.500	(7/2)⁻	M1+E2	−2.7 *+11−25*	0.174 *23*	
		374.5 *2*	19 *6*	178.857	9/2⁻	M1,E2		0.063 *24*	
		427.46 *18*	25 *5*	125.917	11/2⁺	(E1(+M2))	+0.15 *23*	0.013 *21*	
		494.60 *18*	32 *7*	58.540	9/2⁺				Mult.: D(+Q) from ^{167}Lu ε decay;, E1(+M2) from level scheme.
569.40	(7/2)⁺	330.32 *20*	28 *8*	239.168	(5/2)⁻				
		356.23 *15*	100 *19*	213.172	(5/2)⁻	E1		0.01316 *18*	
		443.0[d] *9*	<75[d]	125.917	11/2⁺				
		539.66[d] *20*	<92[d]	29.656	5/2⁺				
571.511	(11/2)⁻	151.96 *2*	11.6 *34*	419.580	(9/2)⁻	M1(+E2)	<1.6	0.90 *12*	B(M1)(W.u.)=9×10^{-7} *+38−7*; B(E2)(W.u.)<0.069
		160.49[d] *2*	<17.8[d]	410.989	7/2⁻	[E2]		0.569 *8*	B(E2)(W.u.)<0.08
		254.0 *2*	15 *4*	317.500	(7/2)⁻	[E2]		0.1236 *18*	B(E2)(W.u.)≈0.0028
		270.00 *10*	4.4 *5*	301.48	11/2⁻	[M1,E2]		0.16 *5*	B(M1)(W.u.)≈1.0×10^{-7} if M1, B(E2)(W.u.)≈0.0006 if E2.
		385.55[d] *12*	<42[d]	185.97	13/2⁺	(E1)		0.01092 *15*	B(E1)(W.u.)<7.2×10^{-9}
		392.61 *10*	39 *4*	178.857	9/2⁻	M1+E2	+0.31 *+17−13*	0.073 *4*	B(M1)(W.u.)≈2.5×10^{-7}; B(E2)(W.u.)≈0.00007
		445.56 *12*	66 *4*	125.917	11/2⁺	E1(+M2)	≤0.11	0.0089 *11*	B(E1)(W.u.)=3×10^{-9} *+6−2*; B(M2)(W.u.)<0.0025
		513.1 *1*	100 *20*	58.540	9/2⁺	(E1)		0.00573 *8*	B(E1)(W.u.)≈3.2×10^{-9}
607.3	(15/2⁻)	306[&] *1*		301.48	11/2⁻				
		421[&] *1*		185.97	13/2⁺				
628.61	7/2⁺	197.80[d] *5*	<30[d]	430.87	7/2⁺	(E2)		0.279 *4*	
		570.0 *2*	86 *37*	58.540	9/2⁺	M1(+E2)	−0.3 *10*	0.028 *9*	
		594.51[d] *20*	<62[d]	33.916	7/2⁺	[M1,E2]		0.019 *7*	
		599.35 *35*	100 *11*	29.656	5/2⁺	M1+E2	+0.14 *12*	0.0255 *7*	
644.43	19/2⁺	236.7[@] *1*	27 *8*	407.71	17/2⁺	(M1+E2)		0.23 *7*	B(M1)(W.u.)=0.035 *+12−10*; B(E2)(W.u.)=3.0×10^{2} *+10−8* B(M1)(W.u.) for pure M1, B(E2)(W.u.) for pure E2. E_{γ}: others: 236.5 *2* from (O,xnγ), 236.5 *5* from (^{48}Ca,5nγ). I_{γ}: unweighted average of 24.5 *19* from (α,3nγ) and 54 *6* from (O,xnγ). Mult.: D+Q from (O,xnγ) and (α,3nγ); M1+E2 from level scheme.
		314.3[@] *1*	100 *10*	330.18	15/2⁺	E2		0.0643 *9*	B(E2)(W.u.)=2.7×10^{2} *+7−5*

From ENSDF

$^{167}_{70}\mathrm{Yb}_{97}$-10

Adopted Levels, Gammas (continued)

γ(^{167}Yb) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[c]	Comments
									E_γ: others: 314.2 *2* from (O,xnγ), 314.2 *5* from (^{48}Ca,5nγ). I_γ: from (O,xnγ) and (α,3nγ). Mult.: α(K)exp in ^{154}Sm(^{16}O,3ne$^-$) (2019Sm01); see details listed in ^{124}Sn(^{48}Ca,5nγ) dataset; Q, ΔJ=2 from (O,xnγ).
677.19	(5/2,7/2)$^-$	368.80[d] *10*	<134[d]	308.405	(7/2)$^-$	[M1,E2]		0.066 *25*	
		398.83[d] *15*	<258[d]	278.194	5/2$^-$	[M1,E2]		0.053 *21*	
		437.75 *22*	63 *19*	239.168	(5/2)$^-$	M1		0.0578 *8*	
		464.32 *20*	100 *17*	213.172	(5/2)$^-$	E2		0.02159 *30*	
		677.23[d] *15*	<310[d]	0.0	5/2$^-$	[M1,E2]		0.014 *5*	
719.62	(7/2)$^-$	278.5 *10*	100 *29*	440.656	7/2$^-$	(E2)		0.0927 *17*	
		479.88[d] *30*	<17[d]	239.168	(5/2)$^-$	M1,E2		0.033 *13*	
		539.66[d] *20*	<30[d]	179.754	(3/2$^-$)				
		640[d] *1*	<12[d]	78.679	7/2$^-$	(M1(+E2))		0.016 *6*	
		685.3 *5*	20 *11*	33.916	7/2$^+$				Mult.: α(K)exp implies mult=E1,E2; Δπ=yes from level scheme.
		689.7 *3*	32 *9*	29.656	5/2$^+$				
		719.81 *25*	28.3 *25*	0.0	5/2$^-$	E2(+M1)	>1.0	0.0097 *22*	
721.33	(21/2$^+$)	76.9[@] *5*	9.7[@] *16*	644.43	19/2$^+$	(M1)[@]		7.19 *17*	B(M1)(W.u.)=0.48 *+21−12* Mult.: D+Q from (α,3nγ); (M1) from RUL, as B(E2)(W.u.) is much larger than value of 1000 from RUL for E2 transitions.
		313.6[@] *1*	100[@] *10*	407.71	17/2$^+$	(E2)[@]		0.0647 *9*	B(E2)(W.u.)=3.5×10^2 *+16−9* Mult.: (Q), ΔJ=(2) from (O,xnγ) and (α,3nγ); M2 ruled out by RUL.
726.50	(13/2$^-$)	155.0[&] *1*	100	571.511	(11/2)$^-$				
783.83	17/2$^-$	341.4[@] *1*	100.0[&] *21*	442.45	13/2$^-$	E2		0.0504 *7*	B(E2)(W.u.)=2.8×10^2 *+13−7* E_γ: other: 341.2 *5* from (^{48}Ca,5nγ), 341.2 *2* from (O,xnγ). I_γ: other: 100 *10* from (O,xnγ). Mult.: Q, ΔJ=2 from (α,3nγ) and (O,xnγ); M2 ruled out by RUL.
		453.4[&] *5*	10.3[&] *5*	330.18	15/2$^+$	[E1]		0.00753 *11*	B(E1)(W.u.)=3.1×10^{-5} *+14−7* E_γ: other: 454 *1* from (O,xnγ). I_γ: other: 52 *8* in (O,xnγ) is discrepant.
788.38	(9/2)$^-$	368.80[d] *10*	<49[d]	419.580	(9/2)$^-$	[M1,E2]		0.066 *25*	
		470.70 *20*	85 *8*	317.500	(7/2)$^-$	M1+E2	≈+0.3	≈0.046	

$^{167}_{70}Yb_{97}$-11

Adopted Levels, Gammas (continued)

γ(^{167}Yb) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[c]	Comments
788.38	(9/2)⁻	479.88[d] *30*	<31[d]	308.405	(7/2)⁻	M1,E2		0.033 *13*	
		549.00 *30*	43 *12*	239.168	(5/2)⁻	E2(+M3)	+0.1 *+4−3*	0.02 *4*	
		609.41 *16*	81 *12*	178.857	9/2⁻	E2(+M1)	≥1.2	0.0138 *28*	
		709.79 *15*	100 *9*	78.679	7/2⁻	E2(+M1)	≥1.8	0.0088 *11*	
		788.44 *20*	42 *5*	0.0	5/2⁻	E2		0.00612 *9*	δ(O/Q)=−0.2 *+5−8* from ε decay.
901.39	(15/2⁻)	174.9 *1*	<900	726.50	(13/2⁻)	E2		0.423 *6*	Eγ from (^{48}Ca,5nγ), Iγ from (α,3nγ). Mult.: α(K)exp in ^{154}Sm(^{16}O,3ne⁻) (2019Sm01); see details listed in ^{124}Sn(^{48}Ca,5nγ) dataset.
		329.7 *4*	100 *20*	571.511	(11/2)⁻				E_γ: weighted average of 329.9 *4* from (^{48}Ca,5nγ) and 329.4 *5* from (α,3nγ), Iγ from (α,3nγ). I_γ: from (α,3nγ).
987.4	(19/2⁻)	380[&] *1*		607.3	(15/2⁻)				
		579[&] *1*		407.71	17/2⁺				
1022.27	(5/2,9/2)⁺	591.32 *10*	80 *4*	430.87	7/2⁺	M1+E2	+3.0 *+21−12*	0.0133 *20*	
		705.3 *5*	10 *5*	317.500	(7/2)⁻				
		963.75 *19*	42 *4*	58.540	9/2⁺	(E2)		0.00400 *6*	Mult.: E1 or E2 from ^{167}Lu ε decay; E1 inconsistent with level scheme.
		988.40 *10*	100 *6*	33.916	7/2⁺	(M1+E2)	+6.4 *61*	0.0039 *32*	Mult.: D+Q from ^{167}Lu ε decay; M1+E2 from level scheme.
1061.20	23/2⁺	339.4[#] *3*	21.8 *9*	721.33	(21/2⁺)	(M1+E2)[#]		0.082 *31*	If M1, B(M1)(W.u.)=0.036 *+8−6*. If E2, B(E2)(W.u.)=147 *+34−24*. E_γ: others: 339.4 *5* from (^{48}Ca,5nγ), 339.8 *5* from (α,3nγ). I_γ: weighted average of 22.2 *9* from (^{48}Ca,5nγ), 21.1 *33* from (O,xnγ), and 18.2 *30* from (α,3nγ). Mult.: D+Q from (O,xnγ); M1+E2 from level scheme.
		416.8[@] *1*	100[&] *5*	644.43	19/2⁺	E2		0.0288 *4*	B(E2)(W.u.)=2.4×10² *+5−4* E_γ: others: 416.4 *2* from (O,xnγ), 416.3 *5* from (^{48}Ca,5nγ). Mult.: Q, ΔJ=2 from (O,xnγ) and (α,3nγ); M2 ruled out by RUL.
1094.65	(17/2⁻)	193.3[&] *2*	100 *29*	901.39	(15/2⁻)				I_γ: from (α,3nγ).
		368.2[&] *4*	≈43	726.50	(13/2⁻)				I_γ: from (α,3nγ).
1122.14	(25/2⁺)	61.2[@] *5*	2.4 *8*	1061.20	23/2⁺	[M1]		2.31 *6*	B(M1)(W.u.)=0.91 *+36−31* Measured Iγ(61.2γ)=2.4 *8*, relative to 100 for 400.5γ (2013Gl01) from γγ-coin data in ^{154}Sm(^{18}O,5nγ) and using intensity balance

From ENSDF

$^{167}_{70}Yb_{97}$-12

Adopted Levels, Gammas (continued)

γ(^{167}Yb) (continued)

E$_i$(level)	J^π_i	E$_γ$[†]	I$_γ$[†]	E$_f$	J^π_f	Mult.[‡]	δ[‡]	α[c]	Comments
									B(M1)(W.u.)=0.91 *+36−31* Measured Iγ(61.2γ)=2.4 *8*, relative to 100 for 400.5γ (2013Gl01) from γγ-coin data in ^{154}Sm(^{18}O,5nγ) and using intensity balance arguments. See details listed in ^{124}Sn(^{48}Ca,5nγ) dataset.
1122.14	(25/2$^+$)	400.9 *2*	100	721.33	(21/2$^+$)	E2		0.0320 *5*	B(E2)(W.u.)=3.9×10^2 *+9−6* E$_γ$: weighted average of 401.0 *1* from (α,3nγ), 400.5 *2* from (O,xnγ), and 400.5 *5* from (^{48}Ca,5nγ). Mult.: Q, ΔJ=2 from (O,xnγ) and (α,3nγ); M2 ruled out by RUL.
1193.22	(21/2$^-$)	409.4[@] *1*	100 *10*	783.83	17/2$^-$	E2		0.0302 *4*	B(E2)(W.u.)=2.8×10^2 *+7−5* E$_γ$: other: 409.1 *5* from (^{48}Ca,5nγ), 409.1 *2* from (O,xnγ). I$_γ$: other: 100 *14* from (α,3nγ).
		548.6 *5*	12.1 *24*	644.43	19/2$^+$	[E1]		0.00496 *7*	B(E1)(W.u.)=5.0×10^{-5} *+17−12* E$_γ$: weighted average of 548.3 *5* from (^{48}Ca,5nγ), 548 *1* from (O,xnγ), and 549.1 *5* from (α,3nγ). I$_γ$: from (O,xnγ). Other: 50 *14* from (α,3nγ) is discrepant.
1267.24	5/2$^+$	855.8[e] *4*	5.4 *11*	410.989	7/2$^-$				
		1188.54 *10*	37.3 *19*	78.679	7/2$^-$	E1(+M2)	−0.06 *+21−24*	0.0011 *8*	
		1267.26 *8*	100 *3*	0.0	5/2$^-$	E1		1.03×10^{-3} *1*	
1304.92	(19/2)$^-$	210.4[&] *2*	100 *25*	1094.65	(17/2$^-$)	E2+M1	1.6 *6*	0.28 *4*	I$_γ$: from (α,3nγ). Mult.: α(K)exp in ^{154}Sm(^{16}O,3ne$^-$) (2019Sm01); see details listed in ^{124}Sn(^{48}Ca,5nγ) dataset.
		403.4[&] *3*	≤100	901.39	(15/2$^-$)				I$_γ$: from (α,3nγ).
1305.53	(7/2$^-$)	677.23[d] *15*	<73[d]	628.61	7/2$^+$	[E1]		0.00319 *4*	
		1092.3 *5*	16 *4*	213.172	(5/2)$^-$				
		1126.62 *12*	79 *6*	178.857	9/2$^-$	(M1(+E2))	+0.06 *24*	0.00534 *21*	Mult.: D(+Q) from ^{167}Lu ε decay; M1+E2 from level scheme.
		1305.46 *12*	100 *8*	0.0	5/2$^-$	(M1+E2)		0.0030 *8*	Mult.: D+Q with Δπ=no favored in ^{167}Lu ε decay.
1356.34	(9/2$^+$,11/2$^+$)	784.82 *10*	100 *5*	571.511	(11/2)$^-$	(E1)		2.38×10^{-3} *3*	
		936.0 *6*	12 *6*	419.580	(9/2)$^-$				

From ENSDF

$^{167}_{70}$Yb$_{97}$-13

$\gamma(^{167}Yb)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[c]	Comments
1356.34	(9/2+,11/2+)	1054.3 *5*	5.0 *25*	301.48	11/2−				
		1175.5 *10*	33 *9*	178.857	9/2−				
		1323.2 *5*	9.5 *30*	33.916	7/2+				
1433.1	(23/2−)	445[&] *1*	100.0[&] *26*	987.4	(19/2−)				
		712[&] *1*	27.6[&] *19*	721.33	(21/2+)				
1531.0	(21/2−)	226.2[&] *2*	100 *33*	1304.92	(19/2)−				I_γ: from (α,3nγ).
		436.2[&] *3*	67 *33*	1094.65	(17/2−)				I_γ: from (α,3nγ).
1570.03	(27/2+)	447.8[#] *5*	11.6[&] *5*	1122.14	(25/2+)	(M1+E2)[#]		0.039 *15*	I_γ: others: 10 *5* from (α,3nγ) and 11.1 *23* from (O,xnγ). Mult.: D+Q from (O,xnγ) and (α,3nγ); M1+E2 from level scheme.
		508.8[@] *1*	100[&] *5*	1061.20	23/2+	(E2)		0.01706 *24*	E_γ: others: 508.9 *5* from (^{48}Ca,5nγ), 508.9 *2* from (O,xnγ). I_γ: others: 100 *10* from (α,3nγ) and (O,xnγ). Mult.: Q from (O,xnγ); likely E2.
1601.81	(29/2+)	479.8[@] *2*	100	1122.14	(25/2+)	(E2)		0.01983 *28*	E_γ: weighted average of 479.4 *5* from (^{48}Ca,5nγ), 479.4 *2* from (O,xnγ), and 479.9 *1* from (α,3nγ). Mult.: Q from (α,3nγ); likely E2.
1657.12	(25/2−)	463.9[#] *2*		1193.22	(21/2−)	(E2)		0.02164 *30*	Mult.: Q from (α,3nγ); likely E2.
		595.9[&] *5*		1061.20	23/2+				
1771.6	(23/2−)	240.7[&] *3*	74[&] *5*	1531.0	(21/2−)				
		466.5[&] *3*	100[&] *6*	1304.92	(19/2)−				
1895.3	(27/2−)	773[&] *1*	100	1122.14	(25/2+)				
1934.7	(27/2−)	501[&] *1*	100[&] *3*	1433.1	(23/2−)				
		813[&] *1*	36.1[&] *25*	1122.14	(25/2+)				
1947.46	(9/2)+	642.11[d] *15*	<10[d]	1305.53	(7/2−)				
		925.29 *30*	3.0 *8*	1022.27	(5/2,9/2)+				
		1227.31 *20*	48.1 *26*	719.62	(7/2)−	E1+M2	+0.39 *+11−9*	0.0023 *6*	
		1375.99 *12*	24.5 *14*	571.511	(11/2)−	(E1+M2)	−1.2 *8*	0.0050 *31*	Mult.: D+Q from ^{167}Yb ε decay; E1+M2 from level scheme.
		1394.07 *17*	19.9 *14*	553.42	9/2−	E1(+M2)	+0.5 *6*	0.0023 *23*	
		1469.98 *20*	12.7 *10*	477.275	9/2−				
		1506.84 *8*	100 *7*	440.656	7/2−	E1+M2	+0.18 *7*	0.00109 *15*	
		1629.7 *5*	12.8 *18*	317.500	(7/2)−	D(+Q)	−2.4 *23*		
1951.12	(9/2)	594.51[d] *17*	<28[d]	1356.34	(9/2+,11/2+)				

γ(^{167}Yb) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[c]	Comments
1951.12	(9/2)	1379.5 *2*	52 *3*	571.511	(11/2)⁻				Mult.: E1,E2 from α(K)exp in ε decay.
		1397.60 *10*	83 *5*	553.42	9/2⁻	Q(+D)			Mult.,δ: −9.8≤δ(Q/D)≤−0.8 or δ≥4.6 favors Δπ=no, but α(K)exp<α(K)(E1).
		1474.3 *7*	12.5 *22*	477.275	9/2⁻				
		1510.39 *15*	60 *7*	440.656	7/2⁻	D+Q	≥+0.3		Mult.,δ: δ(Q/D)=+0.47 *+22−14* or +3.6 *+15−33* from nuclear orientation; mult=E1 from α(K)exp.
		1531.63 *27*	25 *6*	419.580	(9/2)⁻				
		1633.69 *15*	100 *8*	317.500	(7/2)⁻	D(+Q)			Mult.,δ: E1 from α(K)exp in ε decay; δ(Q/D)=+0.04 *12* or +8 *+4−87* from nuclear orientation.
		1824.8 *4*	5.8 *20*	125.917	11/2⁺				
		1917.60 *20*	53 *4*	33.916	7/2⁺	D(+Q)	−0.18 *+18−16*		Mult.: E1 from α(K)exp in ε decay.
		1951.48 *20*	41.7 *33*	0.0	5/2⁻				Mult.,δ: E1 or E2 from α(K)exp; −0.3≤δ(O/Q)≤+6.6 (1981Kr08) from nuclear orientation.
1952.68	(7/2)⁺	597.4 *6*	9 *7*	1356.34	(9/2⁺,11/2⁺)				
		1164.20 *20*	22.7 *22*	788.38	(9/2)⁻	E1(+M2)	≤0.4	0.0019 *7*	
		1275.38 *20*	41.8 *33*	677.19	(5/2,7/2)⁻	E1(+M2)	≤0.1	0.00106 *4*	
		1541.94[d] *15*	<45.5[d]	410.989	7/2⁻				
		1644.49 *10*	100 *7*	308.405	(7/2)⁻	E1			
		1675.6 *4*	31.1 *27*	278.194	5/2⁻	(E1)			
		1713.62 *15*	55 *3*	239.168	(5/2)⁻	E1			
		1873.02 *20*	23.3 *18*	78.679	7/2⁻	(E1)			
		1893.30 *20*	19 *6*	58.540	9/2⁺				
1973.97	5/2,7/2	1554.70[d] *35*	<31[d]	419.580	(9/2)⁻				
		1562.89 *47*	21 *5*	410.989	7/2⁻				
		1656.22 *24*	52 *7*	317.500	(7/2)⁻				
		1665.48 *20*	100 *7*	308.405	(7/2)⁻	D(+Q)			
		1696.29 *39*	40 *7*	278.194	5/2⁻	D(+Q)			
		1895.38 *20*	80 *14*	78.679	7/2⁻	D(+Q)			
		1973.91[d] *14*	<192[d]	0.0	5/2⁻				
1975.17	(9/2)⁺	1255.50 *20*	18.4 *20*	719.62	(7/2)⁻	E1+M2	+0.20 *+18−16*	0.0014 *8*	
		1403.66 *14*	45.4 *27*	571.511	(11/2)⁻	D(+Q)	−0.04 *+25−11*		
		1534.66[d] *21*	<32[d]	440.656	7/2⁻				
		1554.70[d] *35*	<14.4[d]	419.580	(9/2)⁻				
		1849.2 *4*	12.4 *11*	125.917	11/2⁺				
		1941.32 *13*	100 *7*	33.916	7/2⁺	(M1,E2)		0.00153 *24*	
		1945.68[d] *50*	<8.4[d]	29.656	5/2⁺				
1979.49	(7/2⁻)	673.89 *25*	24 *5*	1305.53	(7/2⁻)				

$^{167}_{70}$Yb$_{97}$-15

Adopted Levels, Gammas (continued)

γ(^{167}Yb) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J$^\pi_f$	Mult.[‡]	δ[‡]	α[c]	Comments
1979.49	(7/2$^-$)	1548.43 *15*	64 *7*	430.87	7/2$^+$	D(+Q)	−0.28 *44*		
		1740.50 *27*	34 *6*	239.168	(5/2)$^-$	D+Q	+2.5 *20*		
		1801.0 *3*	9.2 *28*	178.857	9/2$^-$				
		1920.9 *2*	27.6 *28*	58.540	9/2$^+$				
		1945.68[d] *50*	<13[d]	33.916	7/2$^+$				
		1979.55 *15*	100 *5*	0.0	5/2$^-$	D+Q			δ: +0.60 *+25−15* or +2.9 *+16−11* from ε decay.
1995.32	(9/2$^-$)	640[d] *1*	<12[d]	1356.34	(9/2$^+$,11/2$^+$)				Mult.: M1(+E2) for the doublet but level scheme requires Δπ=yes.
		1423.65 *20*	31.8 *24*	571.511	(11/2)$^-$				
		1554.70[d] *35*	<25[d]	440.656	7/2$^-$				
		1584.9 *9*	17 *8*	410.989	7/2$^-$				
		1678.00 *70*	33 *6*	317.500	(7/2)$^-$				
		1936.76 *20*	62 *9*	58.540	9/2$^+$				
		1961.42 *15*	100 *6*	33.916	7/2$^+$	D+Q	+0.17 *9*		
		1995.6 *7*	9 *4*	0.0	5/2$^-$				
1998.42	(9/2)$^+$	642.11[d] *15*	<31[d]	1356.34	(9/2$^+$,11/2$^+$)	(M1(+E2))		0.016 *6*	
		975.9 *3*	5.5 *12*	1022.27	(5/2,9/2)$^+$				
		1426.84 *12*	100 *4*	571.511	(11/2)$^-$	E1+M2	−0.25 *+12−15*		δ: δ(M2/E1)=−0.25 *+12−15* or −3.0 *+10−19* (1981Kr08); evaluators consider lower value as more likely.
		1444.91 *27*	33 *5*	553.42	9/2$^-$	D(+Q)	+0.7 *10*		
		1521.52 *23*	37 *6*	477.275	9/2$^-$	(E1+M2)	+0.4 *1*	0.00163 *32*	
		1558.10 *32*	21 *5*	440.656	7/2$^-$				
		1578.80 *15*	54 *4*	419.580	(9/2)$^-$				
		1588.2 *20*	6.3 *32*	410.989	7/2$^-$				
		1680.81 *25*	82 *6*	317.500	(7/2)$^-$				
		1720.1 *4*	18.5 *24*	278.194	5/2$^-$				
		1758.97[d] *33*	<46[d]	239.168	(5/2)$^-$				
		1819.23 *30*	24.4 *20*	178.857	9/2$^-$				
		1964.75 *20*	47 *4*	33.916	7/2$^+$	D(+Q)	−1.2 *14*		
2012.27	(7/2,9/2$^-$)	1384.2 *3*	27 *5*	628.61	7/2$^+$				
		1534.66[d] *21*	<94[d]	477.275	9/2$^-$				
		1582.0 *13*	41 *14*	430.87	7/2$^+$				
		1833.30 *28*	70 *5*	178.857	9/2$^-$				
		1933.63 *23*	100 *20*	78.679	7/2$^-$	(D+Q)			Mult.: δ(Q/D)=+3.2 *28*, if J(2012)=9/2, δ(Q/D)=+0.6 *7* if J(2012)=7/2 (1981Kr08) from ε decay; ΔJ≠2 from level scheme.
		1954.2[d] *6*	<32[d]	58.540	9/2$^+$				

$^{167}_{70}Yb_{97}$-16

$\gamma(^{167}Yb)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[c]	Comments
2013.04	(7/2$^-$)	991.00 *60*	7.2 *21*	1022.27	(5/2,9/2)$^+$				
		1954.2[d] *6*	<12.3[d]	58.540	9/2$^+$				
		1983.34 *32*	19.2 *21*	29.656	5/2$^+$	D(+Q)	−3.3 *34*		
		2013.04 *15*	100 *5*	0.0	5/2$^-$	(M1+E2)		0.00148 *22*	Mult.: δ(Q/D)=+0.32 *9* or +10 +*23*−*4* favors $\Delta\pi$=no.
2025.6	(25/2$^-$)	254.2[&] *3*	50[&] *3*	1771.6	(23/2$^-$)				
		494.6[&] *3*	100[&] *6*	1531.0	(21/2$^-$)				
2052.80	9/2$^{(-)}$	1735.31 *25*	100 *7*	317.500	(7/2)$^-$	(M1+E2)	+2.2 *18*	0.0016 *5*	Mult.: E1 favored by α(K)exp, but $\Delta\pi$=(no) from level scheme.
		1752.7 *3*	28 *8*	301.48	11/2$^-$				
		1926.5 *3*	51 *5*	125.917	11/2$^+$	D(+Q)	−2.2 *21*		
		1973.91[d] *14*	<210[d]	78.679	7/2$^-$				
		2052.1 *6*	8.3 *11*	0.0	5/2$^-$				
2149.0	(33/2$^+$)	547.2 *1*	100	1601.81	(29/2$^+$)	Q			E_γ: weighted average of 547.0 *5* from (^{48}Ca,5nγ), 547.0 *2* from (^{17}O,4nγ), and 547.3 *1* from (α,3nγ).
2158.92	(29/2$^-$)	501.8[#] *2*	100 *29*	1657.12	(25/2$^-$)	Q[#]			E_γ: other: 501.8 *5* from (^{48}Ca,5nγ). I_γ: from (α,3nγ).
		588.8[&] *5*	114 *29*	1570.03	(27/2$^+$)				E_γ: other: 589 *1* from (^{17}O,4nγ). I_γ: from (α,3nγ) for a possible doublet.
2159.14	(31/2$^+$)	557.8 *5*	11.5[&] *9*	1601.81	(29/2$^+$)				E_γ: weighted average of 557.4 *5* from (^{48}Ca,5nγ), 557.4 *5* from (^{17}O,4nγ), and 558.7 *5* from (α,3nγ).
		589.0 *2*	100[&] *5*	1570.03	(27/2$^+$)	(Q)			E_γ: weighted average of 589.0 *5* from (^{48}Ca,5nγ), 588.9 *2* from (^{17}O,4nγ), and 589.3 *5* from (α,3nγ).
2292.6	(27/2$^-$)	267.1[&] *3*	42[&] *3*	2025.6	(25/2$^-$)				
		520.9[&] *3*	100[&] *6*	1771.6	(23/2$^-$)				
2330.39	9/2$^+$	1541.94[d] *15*	<85[d]	788.38	(9/2)$^-$				
		1701.8 *4*	21.3 *33*	628.61	7/2$^+$	D+Q	+4.9 *46*		
		1758.97[d] *33*	<48[d]	571.511	(11/2)$^-$				
		1889.87 *20*	59.6 *33*	440.656	7/2$^-$				
		1899.68 *22*	60 *4*	430.87	7/2$^+$				
		1910.78 *20*	32.1 *33*	419.580	(9/2)$^-$				
		2151.8 *6*	3.8 *8*	178.857	9/2$^-$				
		2204.34 *20*	30.4 *21*	125.917	11/2$^+$	D+Q	+5.7 *55*		
		2271.81 *20*	100 *5*	58.540	9/2$^+$	(M1+E2)	+0.35 *15*	0.00149 *4*	Mult.: D+Q from nuclear orientation; magnitude of δ favors $\Delta\pi$=no.
		2296.2 *3*	9.2 *8*	33.916	7/2$^+$				

From ENSDF

$^{167}_{70}Yb_{97}$-17

Adopted Levels, Gammas (continued)

γ(^{167}Yb) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	Comments
2359.4	(31/2⁻)	464[&] 1		1895.3	(27/2⁻)		
		758[&] 1		1601.81	(29/2⁺)		
2482.8	(31/2⁻)	548[&] 1	100[&] 4	1934.7	(27/2⁻)		
		881[&] 1	29.3[&] 30	1601.81	(29/2⁺)		
2571.6	(29/2⁻)	279.2[&] 3	35.4[&] 22	2292.6	(27/2⁻)		
		546.0[&] 4	100[&] 7	2025.6	(25/2⁻)		
2684.2	(33/2⁻)	525.1[&] 5	33.0[&] 13	2159.14	(31/2⁺)		E_γ: other: 525 1 from (^{17}O,4nγ).
		525.3[#] 2	100.0[&] 35	2158.92	(29/2⁻)	Q[#]	E_γ: other: 525.3 5 from (^{48}Ca,5nγ).
2751.8	(37/2⁺)	602.8[#] 2	100	2149.0	(33/2⁺)	Q[#]	E_γ: other: 602.8 5 from (^{48}Ca,5nγ).
2817.7	(35/2⁺)	658.4 5		2159.14	(31/2⁺)		E_γ: weighted average of 658.5 5 from (^{48}Ca,5nγ) and 658 1 from (^{17}O,4nγ).
		668.9[&] 5		2149.0	(33/2⁺)		
2862.7	(31/2⁻)	291.2[&] 4	29[&] 2	2571.6	(29/2⁻)		
		570.1[&] 2	100[&] 7	2292.6	(27/2⁻)		
2882.2	(35/2⁻)	523[&] 1		2359.4	(31/2⁻)		
		733[&] 1		2149.0	(33/2⁺)		
3072.9	(35/2⁻)	590[&] 1	100[&] 4	2482.8	(31/2⁻)		
		924[&] 1	22[&] 4	2149.0	(33/2⁺)		
3164.8	(33/2⁻)	301.9[&] 3		2862.7	(31/2⁻)		
		593.2[&] 3		2571.6	(29/2⁻)		
3237.7	(37/2⁻)	420.0[e]		2817.7	(35/2⁺)		
		553.3 5	100 4	2684.2	(33/2⁻)	Q	E_γ: weighted average of 553.4 5 from (^{48}Ca,5nγ) and 553 1 from (^{17}O,4nγ). Mult.: from (O,xnγ).
3399.4	(41/2⁺)	647.6[#] 2	100	2751.8	(37/2⁺)		E_γ: other: 647.6 5 from (^{48}Ca,5nγ).
3460.2	(39/2⁻)	578[&] 1	100	2882.2	(35/2⁻)		
3481.2	(35/2⁻)	618.6[&] 4	100	2862.7	(31/2⁻)		
3533.7	(39/2⁺)	715.9 5		2817.7	(35/2⁺)		E_γ: weighted average of 716.1 5 from (^{48}Ca,5nγ) and 715 1 from (^{17}O,4nγ).
		782.1[&e]		2751.8	(37/2⁺)		
3702.9	(39/2⁻)	630[&] 1	100	3072.9	(35/2⁻)		
3807.3	(37/2⁻)	642.5[&] 5	100	3164.8	(33/2⁻)		
3815.4?	(37/2⁻)	334.3[&e] 5		3481.2	(35/2⁻)		
		650.3[&e] 7		3164.8	(33/2⁻)		
3838.3	(41/2⁻)	304.6[&e]		3533.7	(39/2⁺)		
		600.6 5	100	3237.7	(37/2⁻)	(Q)	E_γ: weighted average of 600.7 5 from (^{48}Ca,5nγ) and 600 1 from (^{17}O,4nγ). Mult.: from (O,xnγ).

$^{167}_{70}Yb_{97}$-18

$\gamma(^{167}$Yb) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	Comments
4078.2	(43/2⁻)	618& 1	100	3460.2	(39/2⁻)		
4091.7	(45/2⁺)	692.3& 5	100	3399.4	(41/2⁺)	Q	E_γ: other: 692.3 10 from (^{17}O,4nγ). Mult.: from (^{48}Ca,5nγ).
4116.7	(39/2⁻)	301.6&e 3		3815.4?	(37/2⁻)		
		308.9& 5		3807.3	(37/2⁻)		
4141.7	(39/2⁻)	660.5& 6	100	3481.2	(35/2⁻)		
4294.8	(43/2⁺)	761.1 11	100	3533.7	(39/2⁺)		E_γ: unweighted average of 762.2 5 from (^{48}Ca,5nγ) and 760 1 from (^{17}O,4nγ).
4372.9	(43/2⁻)	670& 1	100	3702.9	(39/2⁻)		
4434.4	(41/2⁻)	317.6& 4	100& 6	4116.7	(39/2⁻)		
		618.6&e 4		3815.4?	(37/2⁻)		
		627.4& 4	74& 5	3807.3	(37/2⁻)		
4496.7	(45/2⁻)	658.4 8	100	3838.3	(41/2⁻)		E_γ: weighted average of 658.0 5 from (^{48}Ca,5nγ) and 660 1 from (^{17}O,4nγ).
4503.3?	(41/2⁻)	696.0&e 8	100	3807.3	(37/2⁻)		
4734.2	(47/2⁻)	656& 1	100	4078.2	(43/2⁻)		
4764.5	(43/2⁻)	330.0& 4		4434.4	(41/2⁻)		
		648.3&e 7		4116.7	(39/2⁻)		
4834.2	(49/2⁺)	742.5 5	100	4091.7	(45/2⁺)	Q	E_γ: weighted average of 742.6 5 from (^{48}Ca,5nγ) and 742 1 from (^{17}O,4nγ). Mult.: from (^{48}Ca,5nγ).
4860.7	(43/2⁻)	719.0& 8	100	4141.7	(39/2⁻)		
5094.2	(47/2⁺)	799.4& 5	100	4294.8	(43/2⁺)		
5095.9	(47/2⁻)	723& 1	100	4372.9	(43/2⁻)		
5106.2	(45/2⁻)	341.7& 4		4764.5	(43/2⁻)		
		671.3& 9		4434.4	(41/2⁻)		
5213.2	(49/2⁻)	716.5 5	100	4496.7	(45/2⁻)		E_γ: weighted average of 716.6 5 from (^{48}Ca,5nγ) and 716 1 from (^{17}O,4nγ).
5234.0?	(45/2⁻)	730.7&e 8	100	4503.3?	(41/2⁻)		
5444.2	(51/2⁻)	710& 1	100	4734.2	(47/2⁻)		
5454.2	(47/2⁻)	347.6& 4		5106.2	(45/2⁻)		
		690.3& 7		4764.5	(43/2⁻)		
5615.8?	(47/2⁻)	755.1&e 9	100	4860.7	(43/2⁻)		
5636.3	(53/2⁺)	802.1 11	100	4834.2	(49/2⁺)	Q	E_γ: unweighted average of 803.2 5 from (^{48}Ca,5nγ) and 801 1 from (^{17}O,4nγ). Mult.: from (^{48}Ca,5nγ).
5812.8	(49/2⁻)	358.7& 4		5454.2	(47/2⁻)		
		706.8& 6		5106.2	(45/2⁻)		
5878.9	(51/2⁻)	783& 1	100	5095.9	(47/2⁻)		

$^{167}_{70}$Yb$_{97}$-19

Adopted Levels, Gammas (continued)

$\gamma(^{167}Yb)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	Comments
5919.4	(51/2+)	825.2[&] 5	100	5094.2	(47/2+)		
5986.6	(53/2−)	773.4[&] 5	100	5213.2	(49/2−)		
6016.2?	(49/2−)	782.2[&e] 9	100	5234.0?	(45/2−)		
6178.8	(51/2−)	366.0[&] 6		5812.8	(49/2−)		
		724.0[&] 8		5454.2	(47/2−)		
6217.2	(55/2−)	773[&] 1	100	5444.2	(51/2−)		
6506.7	(57/2+)	870.4[&] 5	100	5636.3	(53/2+)	Q	Mult.: from (^{48}Ca,5nγ).
6553.0	(53/2−)	374.0[&] 5		6178.8	(51/2−)		
		741.0[&] 8		5812.8	(49/2−)		
6726.9	(55/2−)	848[&] 1	100	5878.9	(51/2−)		
6758.2	(55/2+)	838.8[&] 5	100	5919.4	(51/2+)		
6818.7	(57/2−)	832.1[&] 5	100	5986.6	(53/2−)		
6936.3	(55/2−)	383.5[&] 6		6553.0	(53/2−)		
		757.0[&] 9		6178.8	(51/2−)		
7057	(59/2−)	840[&] 1	100	6217.2	(55/2−)		
7335.2	(57/2−)	782.2[&] 9	100	6553.0	(53/2−)		
7445.9	(61/2+)	939.2[&] 5	100	6506.7	(57/2+)		
7639.6	(59/2+)	881.3[&] 5	100	6758.2	(55/2+)		
7640	(59/2−)	913[&] 1	100	6726.9	(55/2−)		
7714.3	(61/2−)	895.6[&] 5	100	6818.7	(57/2−)		
7744.1	(59/2−)	807.8[&] 7	100	6936.3	(55/2−)		
7965	(63/2−)	908[&] 1	100	7057	(59/2−)		
8173.9?	(61/2−)	838.7[&e] 8	100	7335.2	(57/2−)		
8452.7	(65/2+)	1006.8[&] 5	100	7445.9	(61/2+)		
8568.1	(63/2+)	928.5[&] 5	100	7639.6	(59/2+)		
8605.1?	(63/2−)	861.0[&e] 8	100	7744.1	(59/2−)		
8614	(63/2−)	974[&] 1	100	7640	(59/2−)		
8678.5	(65/2−)	964.2[&] 5	100	7714.3	(61/2−)		
8938	(67/2−)	973[&] 1	100	7965	(63/2−)		
9523.2	(69/2+)	1070.5[&] 5	100	8452.7	(65/2+)		
9540.1	(67/2+)	972.0[&] 5	100	8568.1	(63/2+)		
9638	(67/2−)	1024[&] 1	100	8614	(63/2−)		
9711.5	(69/2−)	1033.0[&] 5	100	8678.5	(65/2−)		

Adopted Levels, Gammas (continued)

$\gamma(^{167}Yb)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f
9973	$(71/2^-)$	1035[&] 1	100	8938	$(67/2^-)$	12989.6	$(81/2^+)$	1176.8[&] 5	100	11812.8	$(77/2^+)$
10563.1	$(71/2^+)$	1023.0[&] 5	100	9540.1	$(67/2^+)$	13180.7	$(81/2^-)$	1212.8[&] 5	100	11967.9	$(77/2^-)$
10648.5	$(73/2^+)$	1125.3[&] 5	100	9523.2	$(69/2^+)$	13886.6	$(83/2^+)$	1123[d&] 1	100[d]	12763.6	$(79/2^+)$
10714	$(71/2^-)$	1076[&] 1	100	9638	$(67/2^-)$	14172.3	$(85/2^+)$	1182.7[&] 5	100	12989.6	$(81/2^+)$
10810.3	$(73/2^-)$	1098.8[&] 5	100	9711.5	$(69/2^-)$	14359.7	$(85/2^-)$	1179[&] 1	100	13180.7	$(81/2^-)$
11053	$(75/2^-)$	1080[&] 1	100	9973	$(71/2^-)$	15051.0	$(87/2^+)$	1164.4[&] 5	100	13886.6	$(83/2^+)$
11640.6	$(75/2^+)$	1077.5[&] 5	100	10563.1	$(71/2^+)$	15383.7	$(89/2^+)$	1211.4[&] 5	100	14172.3	$(85/2^+)$
11812.8	$(77/2^+)$	1164.3[&] 5	100	10648.5	$(73/2^+)$	15548.7	$(89/2^-)$	1189[&] 1	100	14359.7	$(85/2^-)$
11967.9	$(77/2^-)$	1157.6[&] 5	100	10810.3	$(73/2^-)$	16275	$(91/2^+)$	1224[&] 1	100	15051.0	$(87/2^+)$
12763.6	$(79/2^+)$	1123[d&] 1	100[d]	11640.6	$(75/2^+)$	16767.7	$(93/2^-)$	1219[&] 1	100	15548.7	$(89/2^-)$

† From ^{167}Lu ε decay, except where noted. Upper limits are reported for photon branching ratios affected by multiple placement.

‡ From ^{167}Lu ε decay based on ce data and/or $\gamma(\theta)$, except where noted. When comments indicate that mult is from (α,3nγ), (^{48}Ca,5nγ) or (O,xnγ), it is based on $\gamma(\theta)$ data; D+Q intraband transitions are assigned (M1+E2), stretched Q transitions from (O,xnγ) and (^{48}Ca,5nγ) are assigned (E2) and stretched Q transitions from (α,3nγ) are assigned E2 since RUL disallows M2 (based on $T_{1/2}$<15 ns for parent levels).

From (O,xnγ).

@ From (α,3nγ).

& From (^{48}Ca,5nγ).

a Deduced from I(γ+ce) in ^{167}Lu ε decay and α for indicated multipolarity.

b Upper limit deduced from I(γ+ce) in ^{167}Lu ε decay and assumed mult=M1,E2.

c 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.

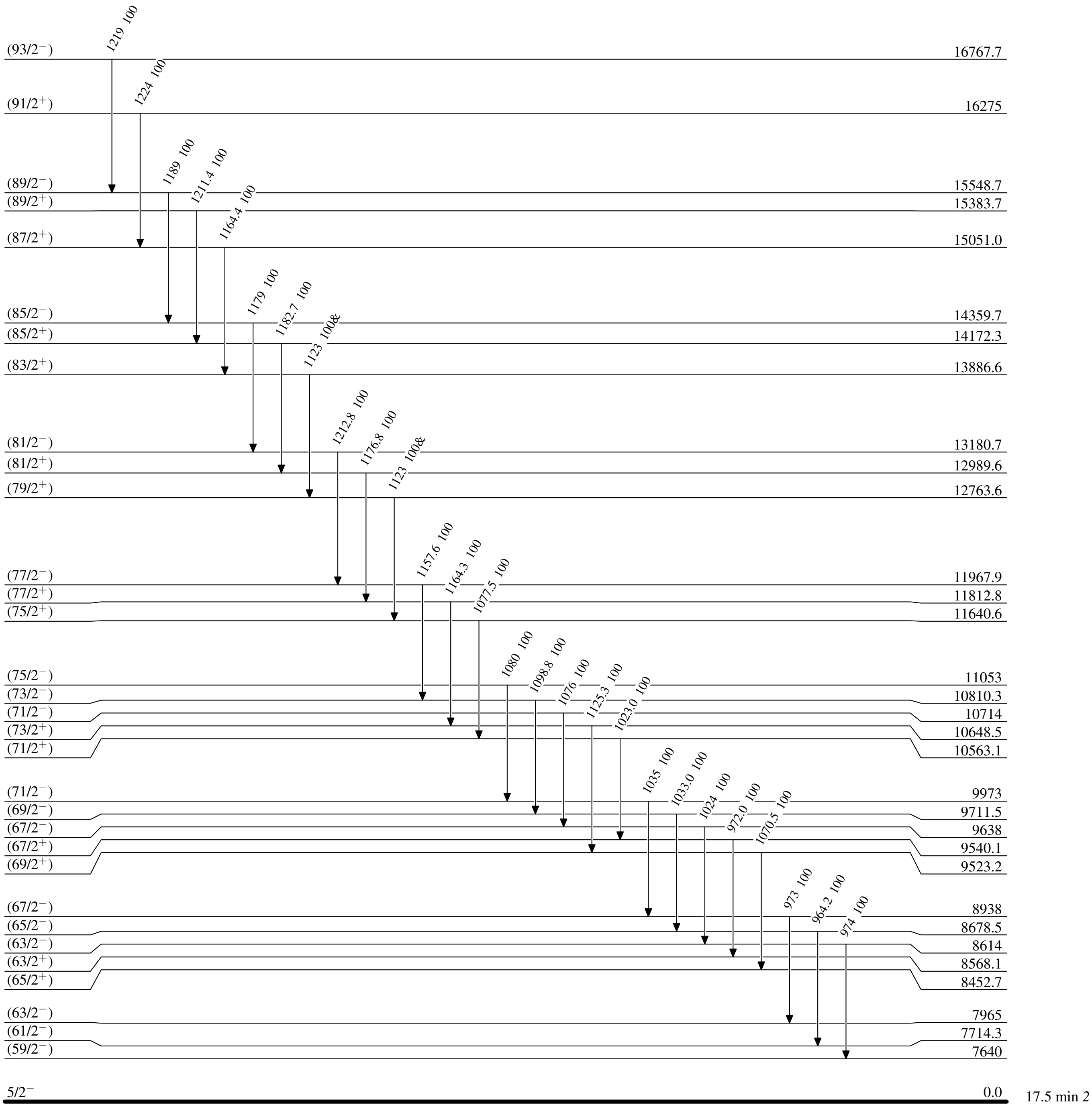
d Multiply placed with undivided intensity.

e Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



$^{167}_{70}Yb_{97}$

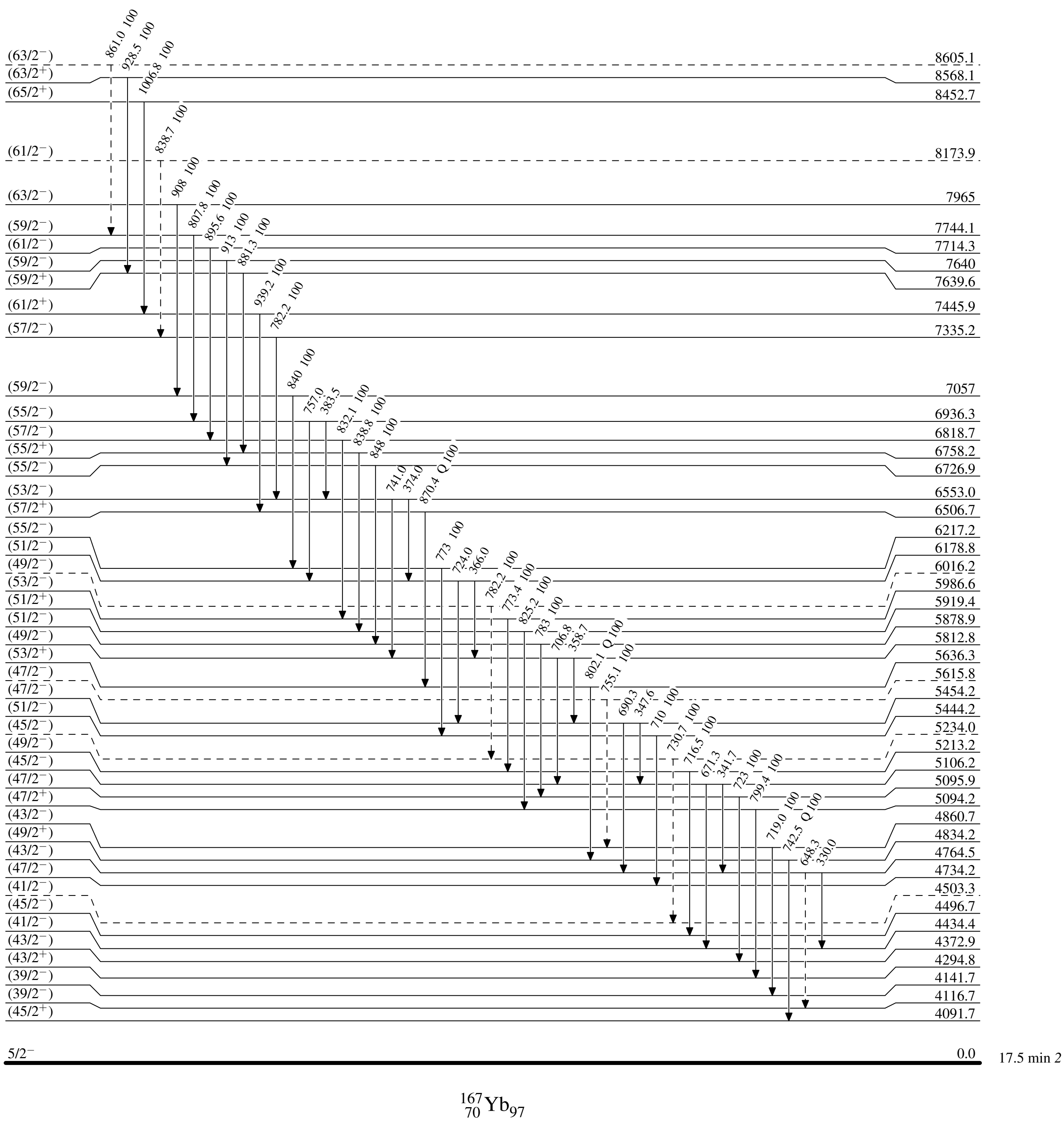
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

γ Decay (Uncertain)

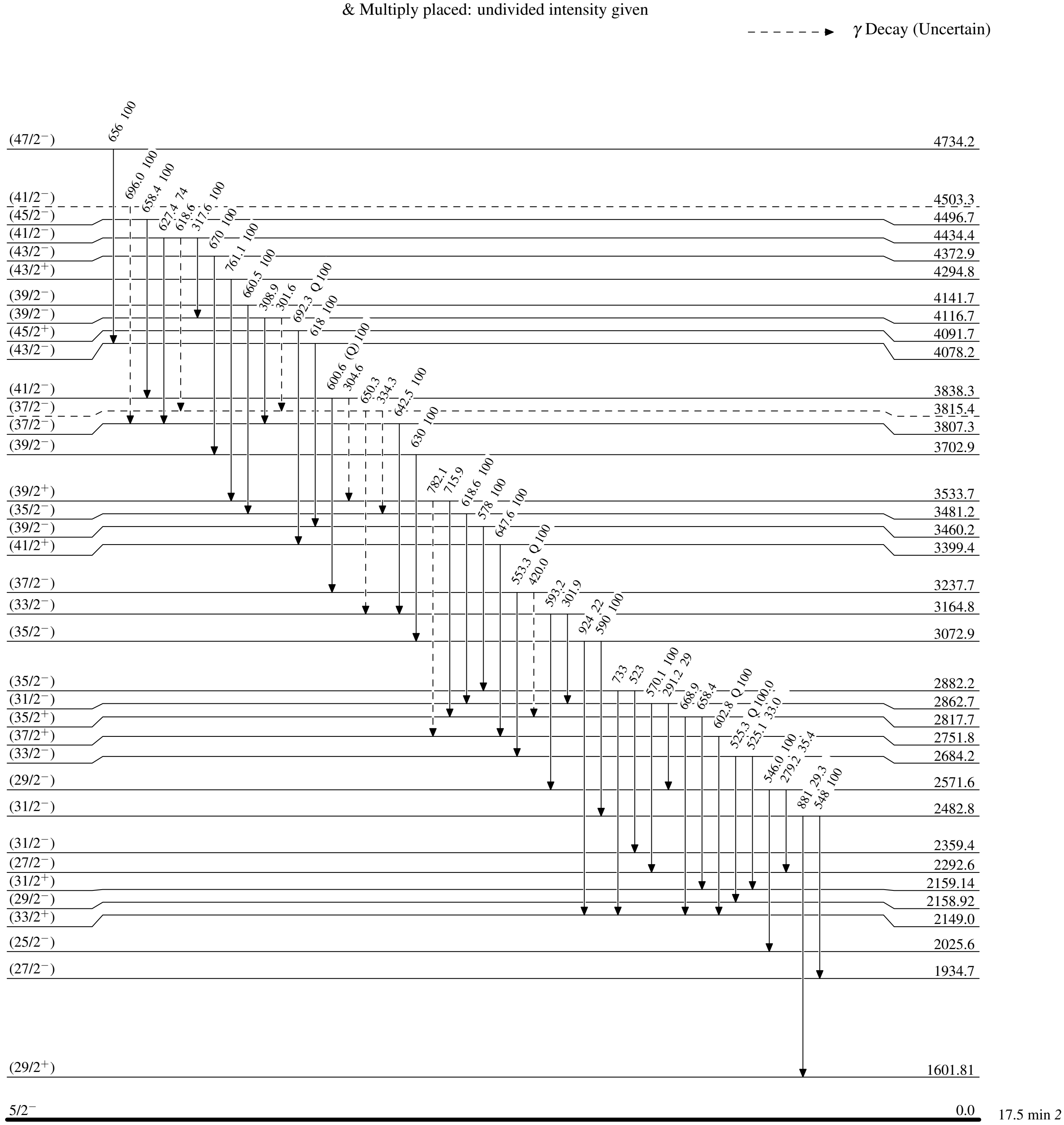


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

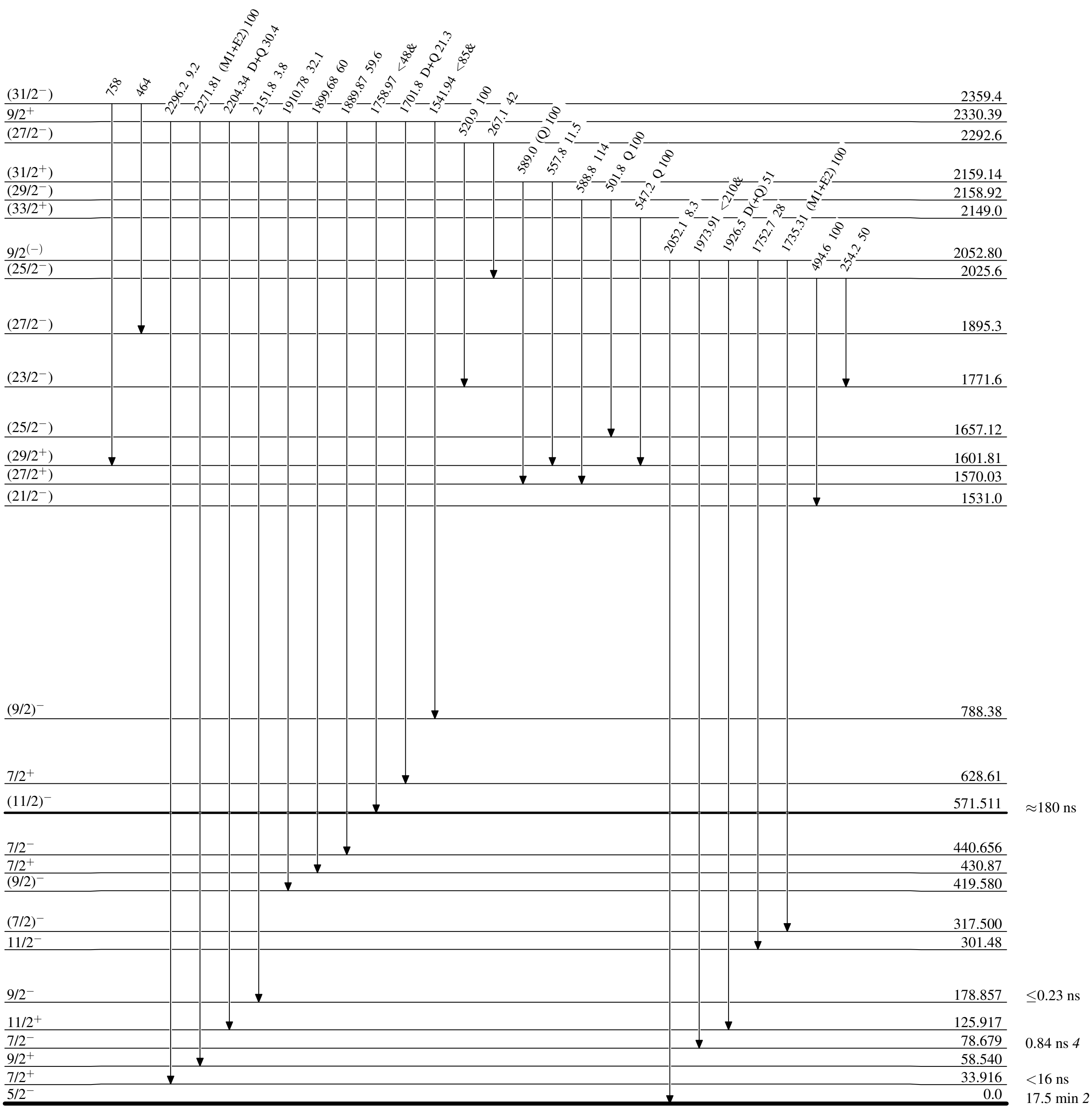


$^{167}_{70}Yb_{97}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

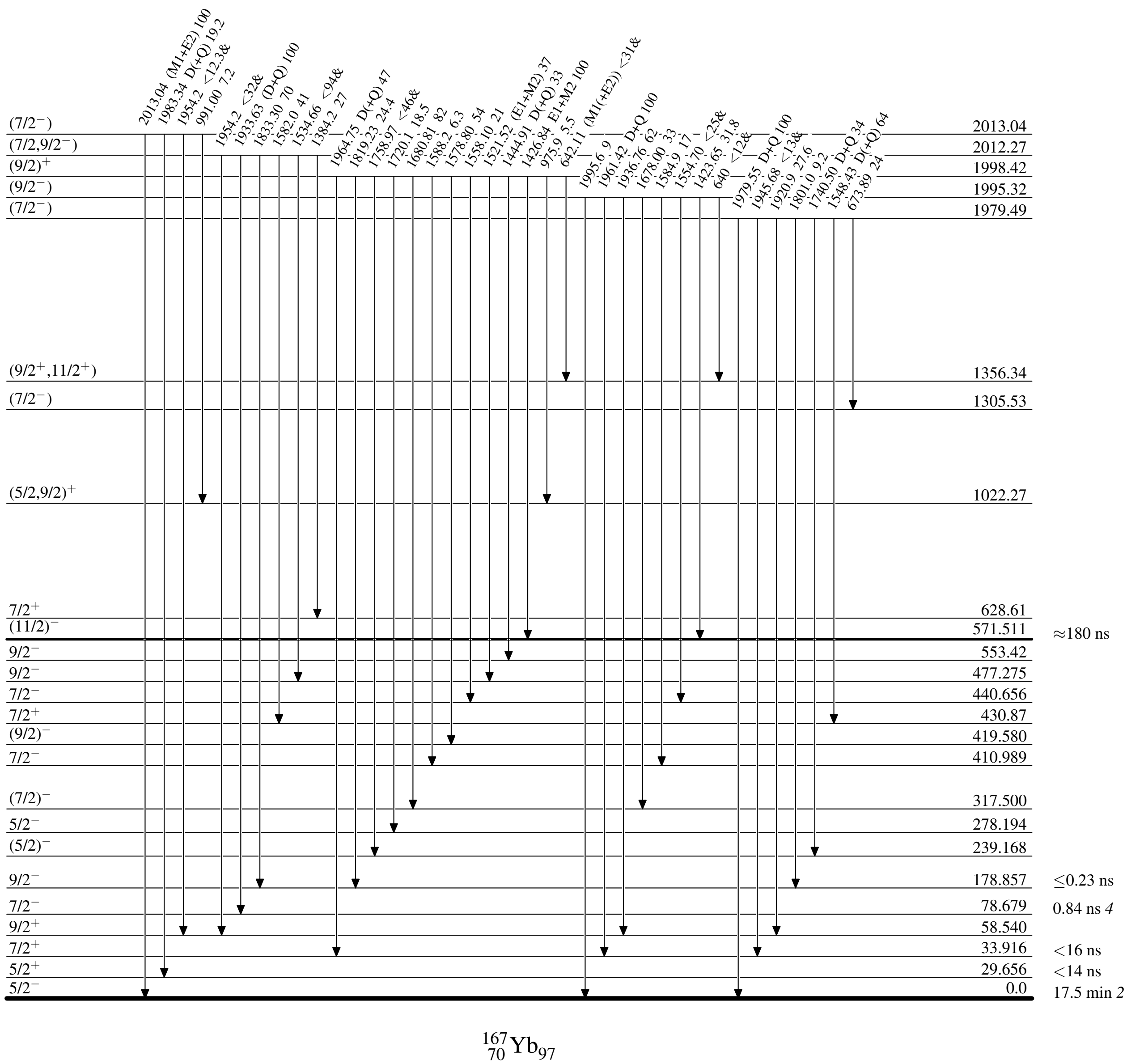


$^{167}_{70}Yb_{97}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

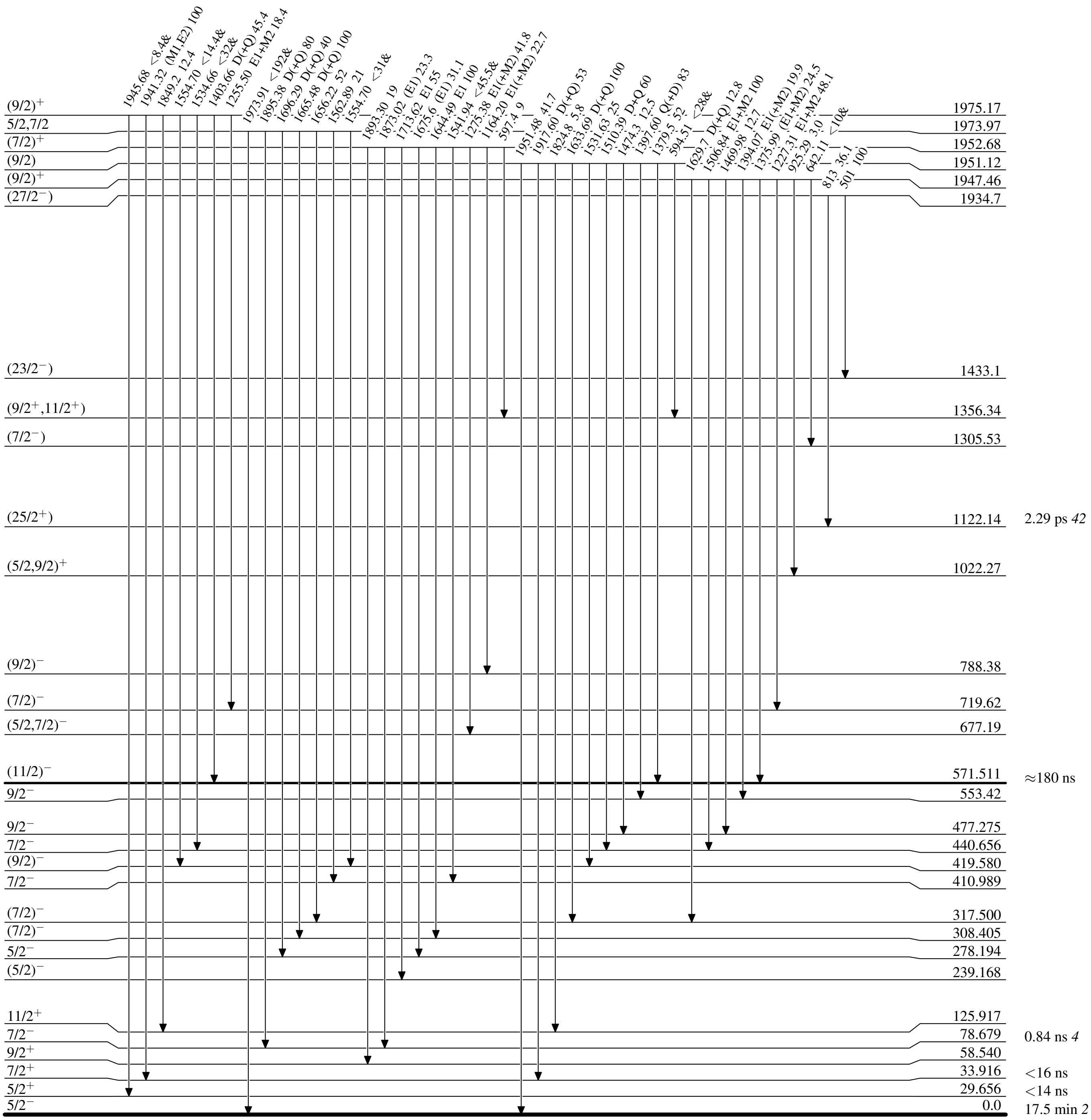


Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

& Multiply placed: undivided intensity given



$^{167}_{70}Yb_{97}$

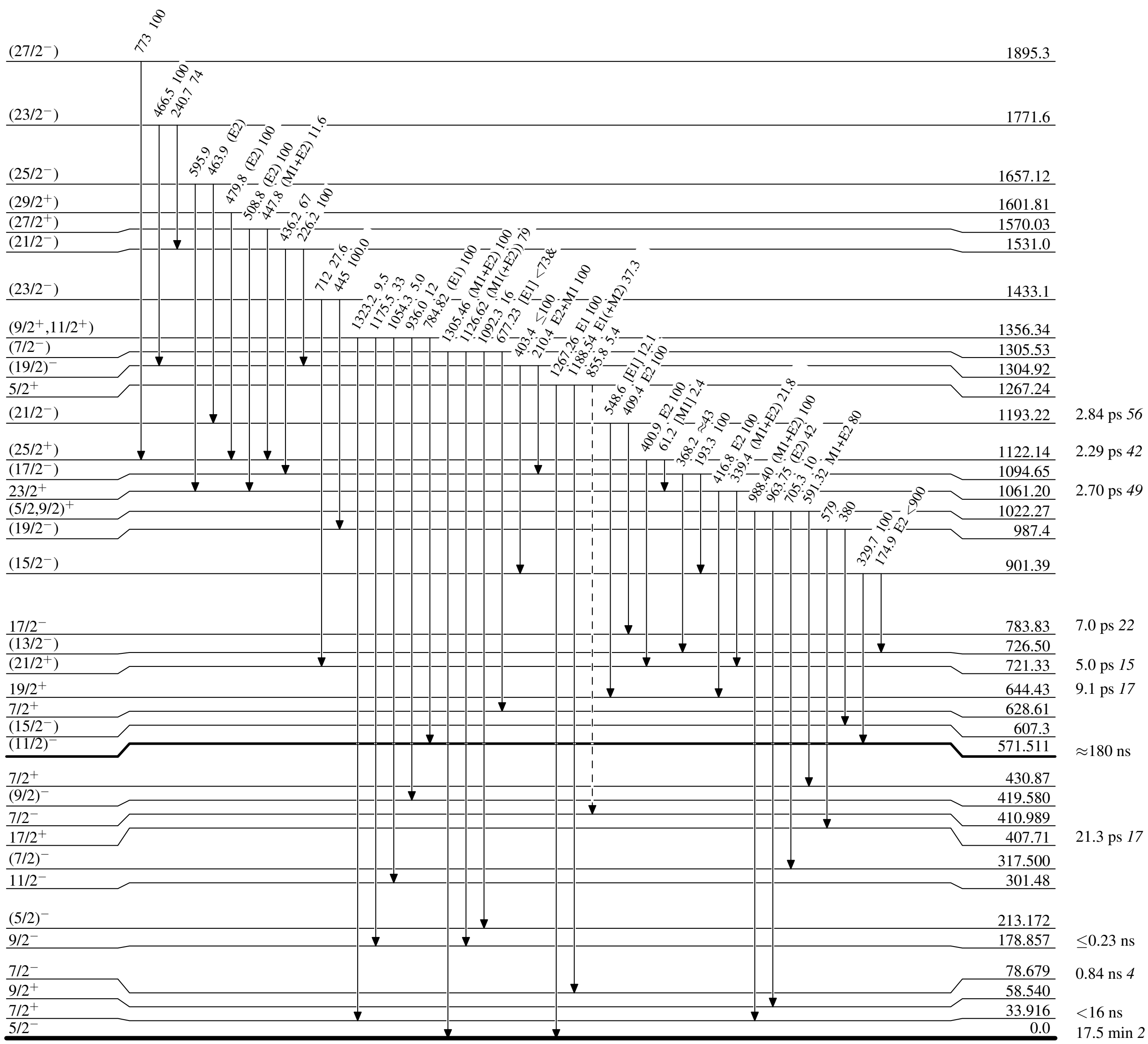
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

- - - - - - ► γ Decay (Uncertain)

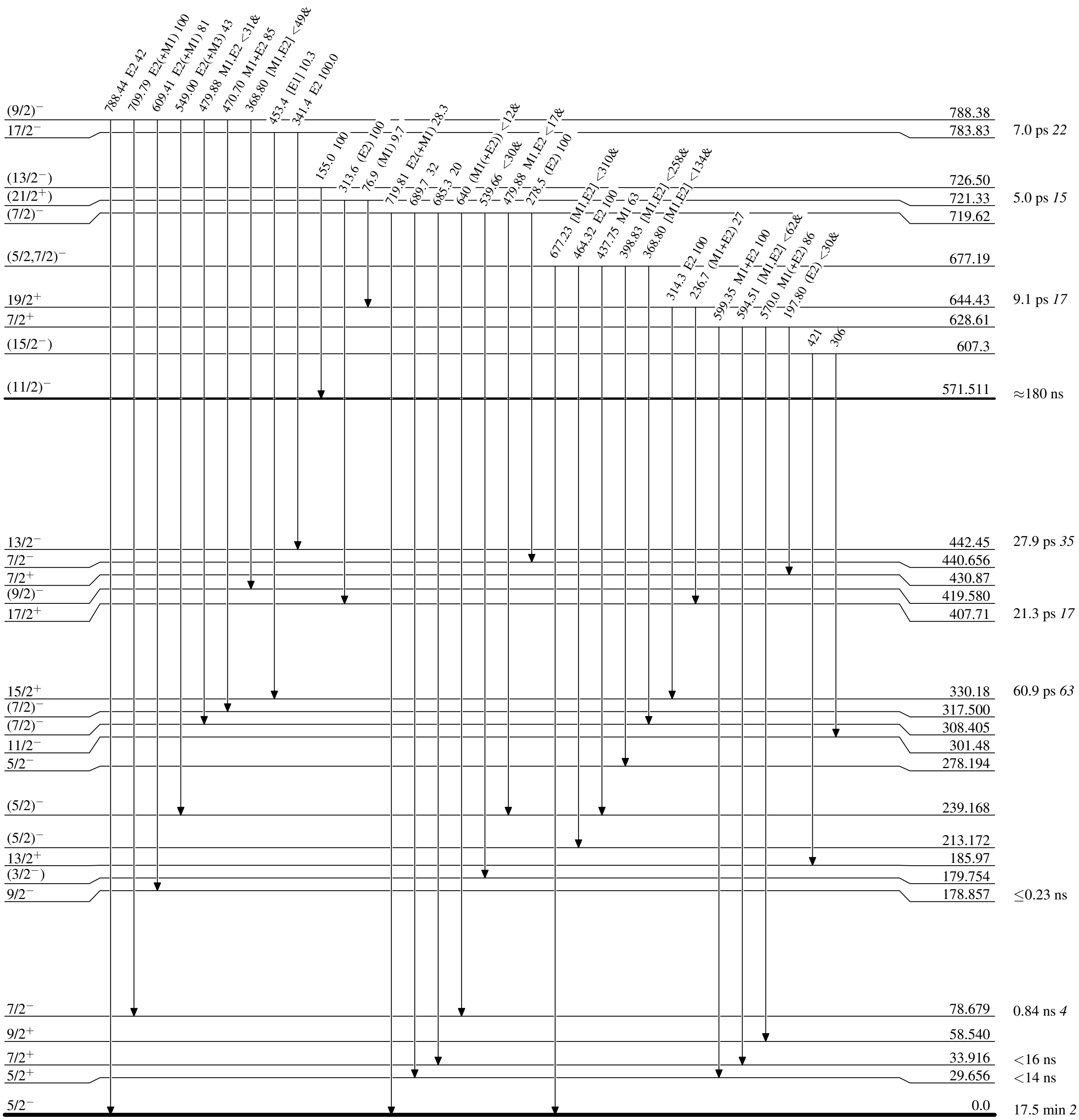


$^{167}_{70}Yb_{97}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



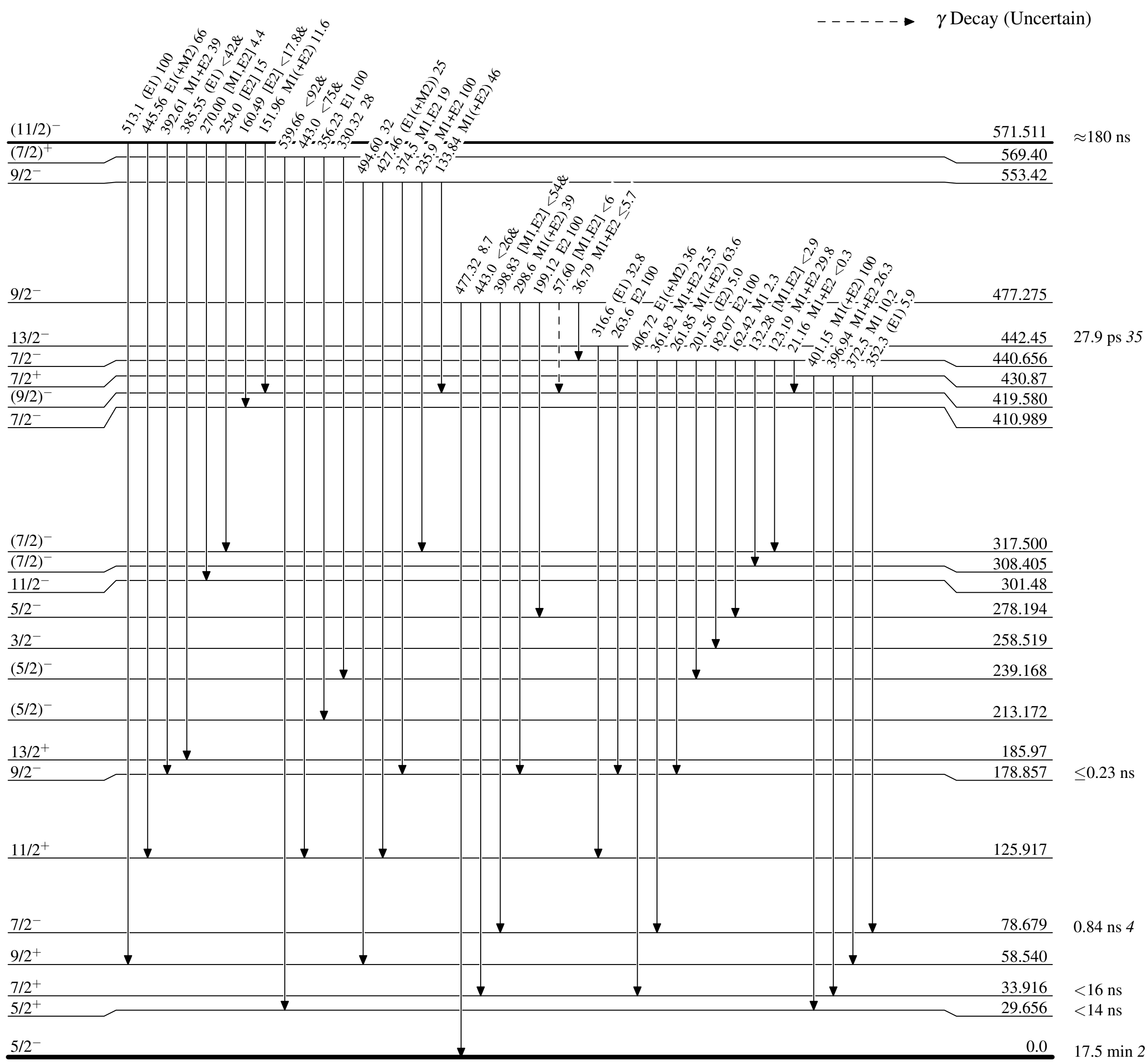
$^{167}_{70}Yb_{97}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

Legend

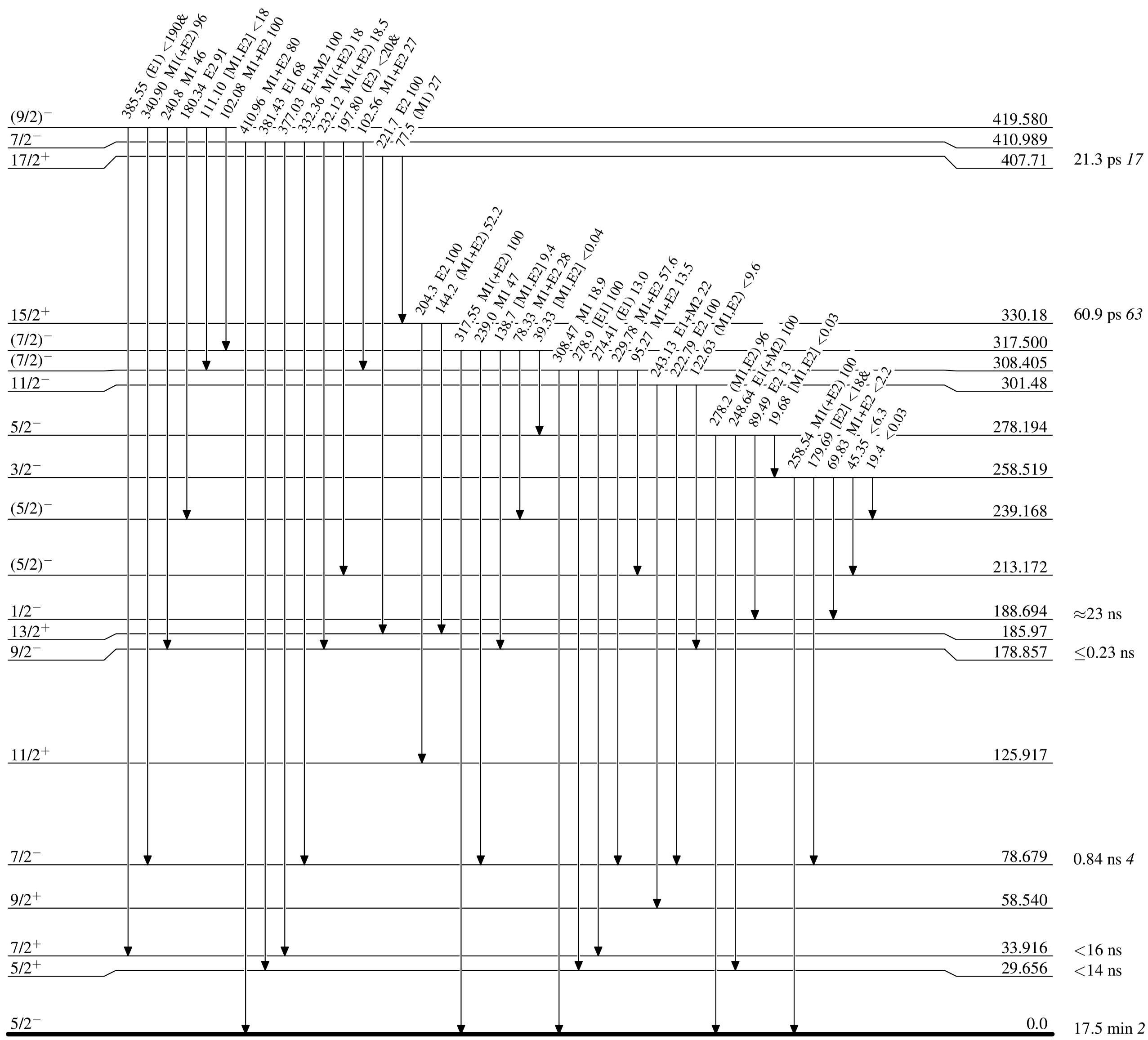


$^{167}_{70}Yb_{97}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

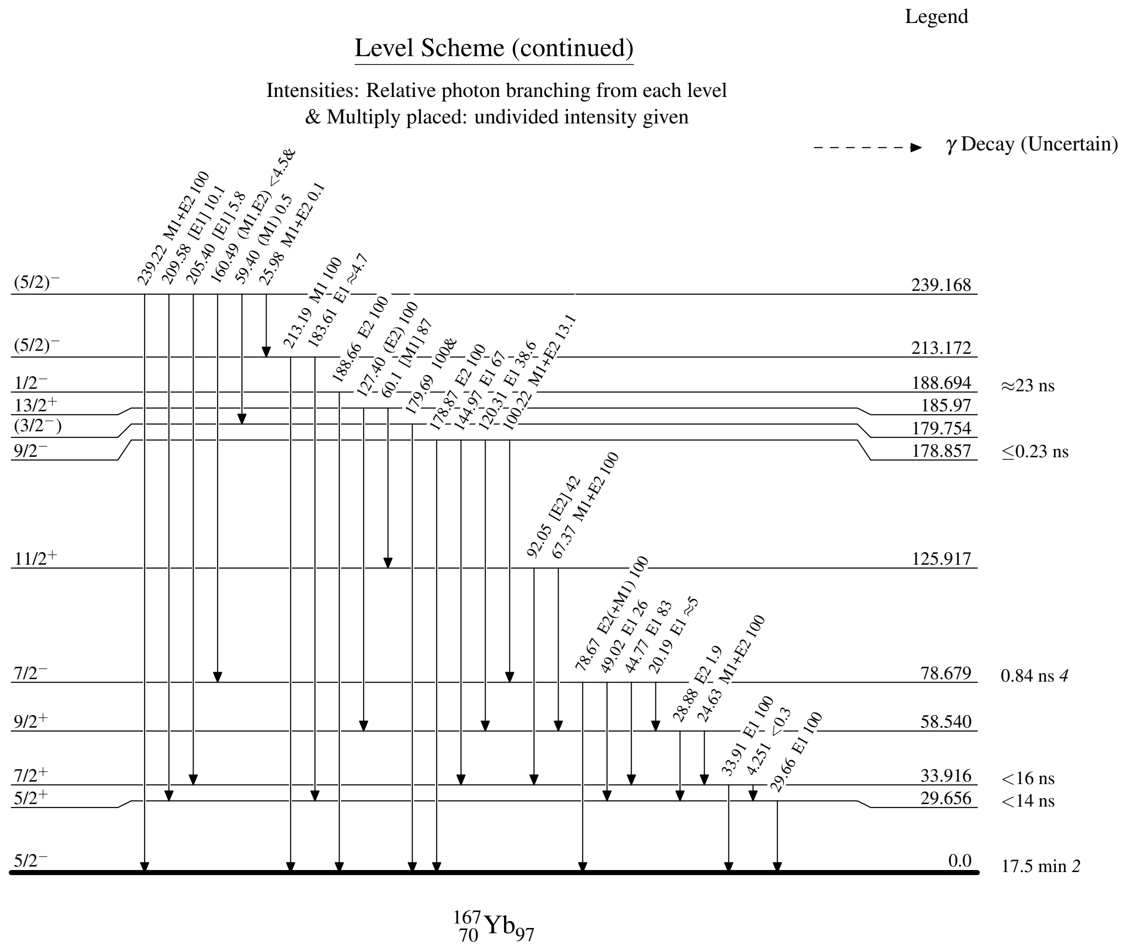


$^{167}_{70}Yb_{97}$

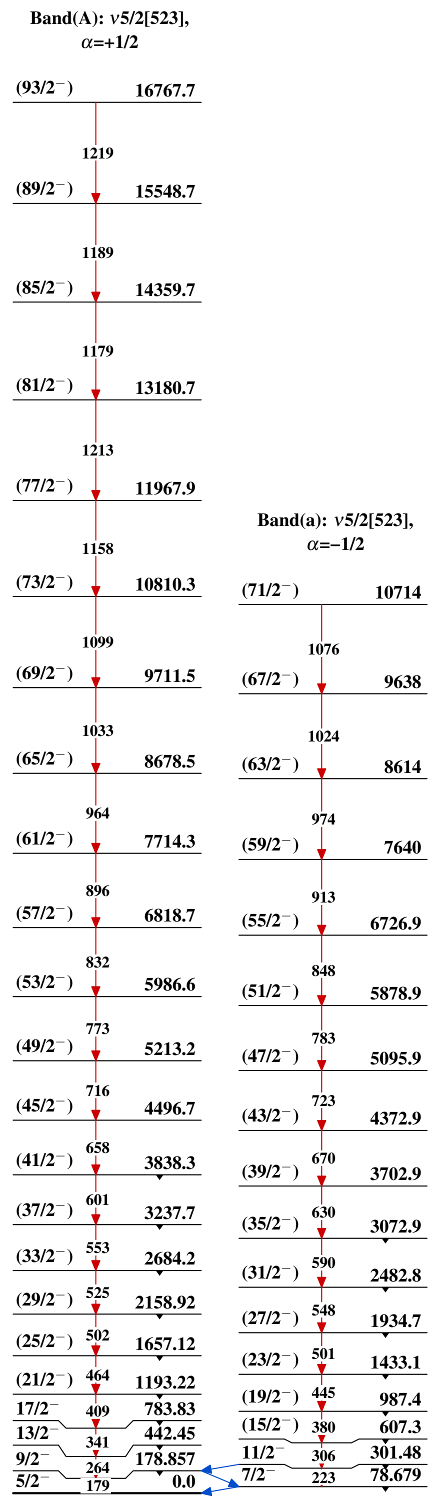
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

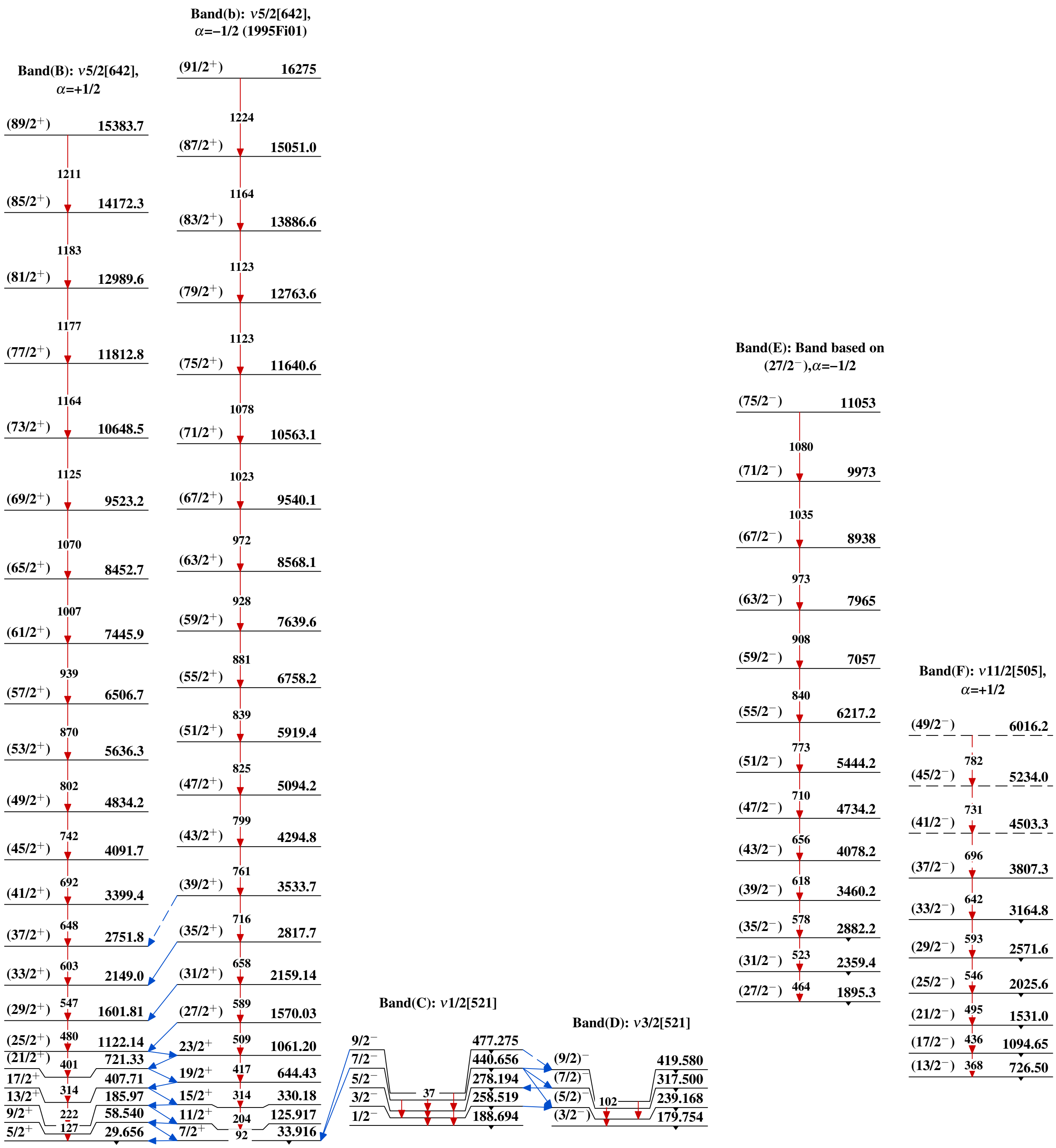


Adopted Levels, Gammas



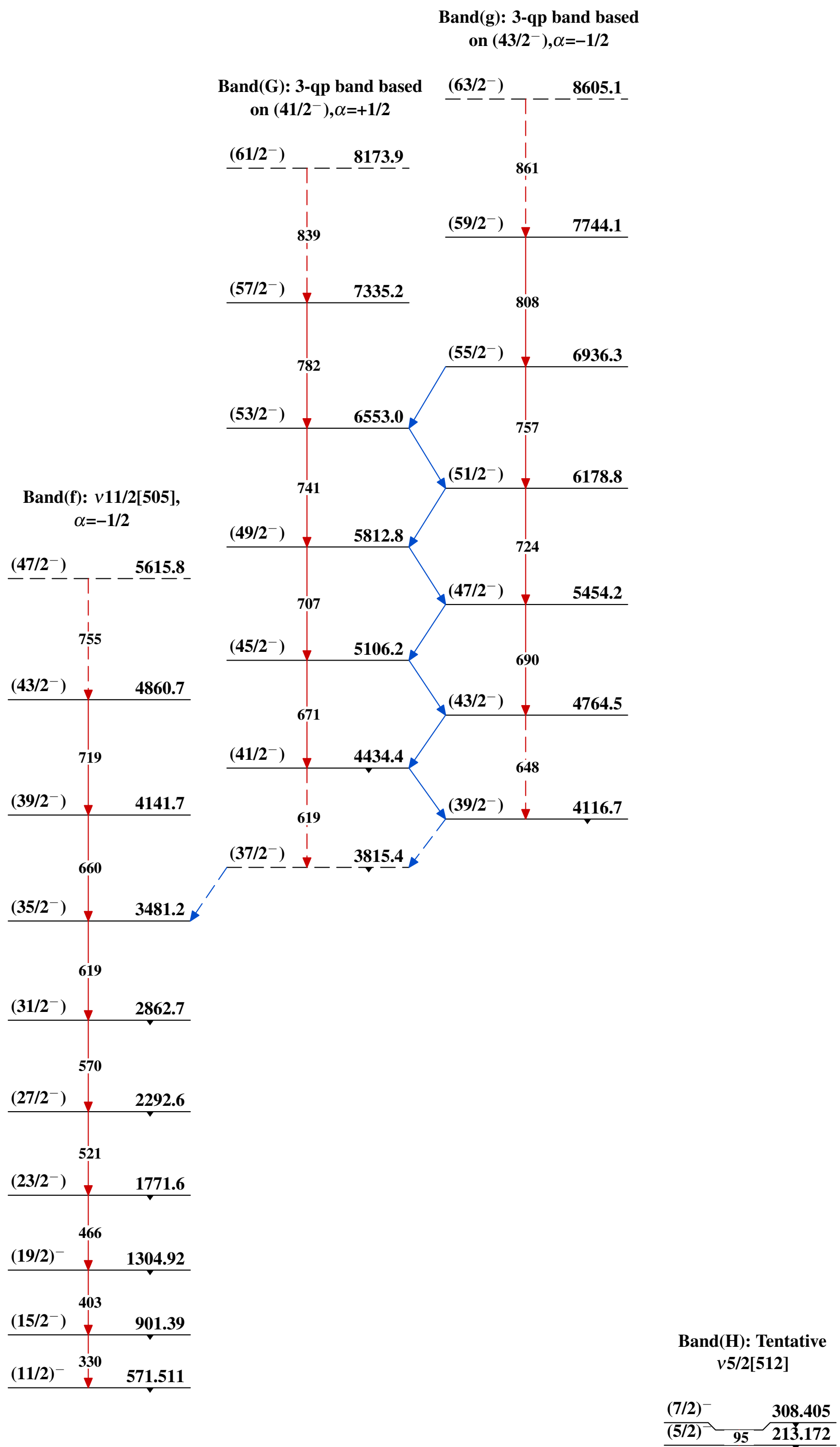
$^{167}_{70}Yb_{97}$

Adopted Levels, Gammas (continued)



$^{167}_{70}Yb_{97}$

Adopted Levels, Gammas (continued)



$^{167}_{70}Yb_{97}$