Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov and A. Rodionov, F. G. Kondev	NDS 112, 855 (2011)	31-Oct-2010

Q(β^-)=−2.06×10^3 *3*; S(n)=7189.9 *4*; S(p)=7686.3 *23*; Q(α)=−1282.4 *10* 2012Wa38
Note: Current evaluation has used the following Q record.
Q(β^-)=−2059 *28*; S(n)=7186.9 *4*; S(p)=7686.5 *21*; Q(α)=−1282.7 *10* 2009AuZZ

^{133}Ba Levels

Cross Reference (XREF) Flags

A ^{133}Ba IT decay
B ^{133}La ε decay (3.912 h)
C ^{124}Sn(^{12}C,3nγ)
D ^{124}Sn(^{13}C,4nγ)
E ^{132}Ba(pol d,p) E=12 MeV

E(level)[†]	J$^\pi$	$T_{1/2}$	XREF	Comments
0.0[‡]	1/2$^+$	10.551 y *11*	ABCDE	%ε=100 μ=0.771674 *16* (1987Kn10,2005St24) J$^\pi$: optical spectroscopy (1976Ho13), laser spectroscopy (1978No09), L=0 in (pol d,p). $T_{1/2}$: weighted average of 3840.3 d *89* (2010Sc08), 3854.7 d *28* (2002Un02), 3849.1 d *18* (1997Ma75, the uncertainty is 3σ), 3842 d *18* (1983Wa26), 3885.9 d *43* (1983Ki08), 3848.0 d *33* (1980Ho17, the uncertainty is 3σ), 3850 d *55* (1979HaYC), 3981 d *37* (1972Em01), 3894 d *44* (1968Re04), 3908 d *73* (1961Wy01). Others: 3840.5 d *65* (2004Sc04, superseded by 2010Sc08), 3853.6 d *36* (1992Un01, superseded by 2002Un02), 3828 d *11* (1982HoZJ, superseded by 2002Un02), 4127 d *260* (1973Ll01), 3781 d *15* (1970Wa19, superseded by 1983Wa26), and 2849 d *37* (1968La10). μ: trapped ion spectroscopy. configuration: dominant $\nu(s^{-1}_{1/2})$.
12.327[#] *6*	3/2$^+$	7.0 ns *3*	ABCDE	μ=+0.58 *8* J$^\pi$: 12.327γ M1+E2 to 1/2$^+$ g.s.; L=2 in (pol d,p). $T_{1/2}$: weighted average of 7.3 ns *5* (1981An17), 6.8 ns *4* (1979An06) and 8.1 ns *20* (1965Th05), delayed coincidences; values differ strongly from $T_{1/2}$=18.0 ns *4* (1980Mi13). μ: from x-ray hyperfine shift measurements 1996MI32 (corrected previous value μ=+0.51 *7* of 1981Gr18). configuration: dominant $\nu(d^{-1}_{3/2})$.
288.252[d] *9*	11/2$^-$	38.93 h *10*	ABCDE	%ε=0.0104 *5*; %IT=99.9896 *5* μ=0.91 *5*; Q=0.89 *7* %ε,%IT: from Iγ(632.5,^{133}Cs)/Iγ(275.9,^{133}Ba)=0.00058 *4*: weighted average of 0.00061 *3* (1971Su04), 0.00049 *5* (1980AnZG) and, 0.00055 *10* (1969Be76). J$^\pi$: laser spectroscopy (1978No09), 275.9γ M4 to 3/2$^+$; L=5 in (pol d,p); μ,Q: from collinear fast beam laser spectroscopy (1983Mu12); μ=−0.91 *4*, Q=1.08 *3* (1979Be25). $T_{1/2}$: weighted average of 38.92 h *9* (2011Gr01), 38.9 h *1* (1960Wi10) and 40.0 h *5* (1941Co03). Other: 38.05 h *4* (1980AnZG) and 42.5 h (1951Hi52). configuration: $\nu(h^{-1}_{11/2})$.
291.188[‡] *9*	5/2$^+$		BCD	J$^\pi$: 291.17γ E2 to 1/2$^+$ g.s.; systematics.
302.395 *11*	3/2$^+$		BC E	J$^\pi$: 302.38γ M1 to 1/2$^+$ g.s.; L=2 in (pol d,p); direct feeding in ^{133}La ε decay (J^π=5/2$^+$).
539.799 *13*	1/2$^+$		B E	XREF: E(500). J$^\pi$: 527.464 γ M1+E2 to 3/2$^+$; not fed directly in ^{133}La ε decay (J^π=5/2$^+$). E(level): probably identical to 500 *5* level with L=0 in (pol d,p).

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Adopted Levels, Gammas (continued)

^{133}Ba Levels (continued)

E(level)[†]	Jπ	XREF	Comments
577.555[#] *13*	7/2+	BCD	Jπ: 565.231γ E2 to 3/2+; direct feeding in ^{133}La ε decay (Jπ=5/2+).
630.568 *10*	5/2+	B E	Jπ: 618.241γ M1 to 3/2+, 630.578γ E2 to 1/2+; L=2 in (pol d,p).
676.488 *12*	3/2+,5/2+	B E	XREF: E(674.3). Jπ: L=2 in (pol d,p); 676.47γ M1,E2 to 1/2+, 374.13γ to 3/2+.
791.1 *5*	7/2−	E	Jπ: L=3 in (pol d,p).
858.499 *11*	3/2+	B E	Jπ: 858.496γ M1+E2 to 1/2+; L=2 in (pol d,p).
862.80 *9*	(7/2)+	B	Jπ: 850.43γ M1,E2 to 3/2+; direct population in ^{133}La ε decay (Jπ=5/2+); non observation of γ to 1/2+ g.s. would argue against 3/2+ and 5/2+.
883.39[‡] *4*	9/2+	B D	Jπ: 592.22γ E2 to 5/2+, 305.9γ (M1) to 7/2+.
887.135 *12*	5/2+	B E	XREF: E(886.0). Jπ: 584.734γ M1+E2 to 3/2+; L=2 in (pol d,p).
901.80[e] *8*	13/2−	CD	Jπ: 613.6γ M1+E2 to 11/2−, band assignment.
923.957 *10*	5/2+	B	Jπ: 923.9γ to 1/2+ g.s., 632.765γ M1 to 5/2+, 428.70γ M1 from 7/2+, direct population in ^{133}La ε decay (Jπ=5/2+).
968.97[d] *8*	15/2−	CD	Jπ: 680.7γ E2 to 11/2−; band assignment.
969.4 *5*		E	
1021.584 *23*	3/2+	B	Jπ: 1021.62γ to 1/2+ g.s., 1009.31γ M1 to 3/2+; population in ^{133}La ε decay (Jπ=5/2+).
1066.8 *5*		E	
1111.2 *5*	5/2−,7/2−	E	Jπ: L=3 in (pol d,p).
1112.346 *12*	3/2+,5/2+,7/2+	B	Jπ: 821.13γ M1 to 5/2+; direct population in ^{133}La ε decay (Jπ=5/2+).
1211.792 *12*	3/2+,5/2+	B E	Jπ: 909.27γ M1 to 3/2+, 920.623γ M1 to 5/2+.
1247.7 *5*	1/2+	E	Jπ: L=0 in (pol d,p).
1271.3 *5*	7/2−	E	Jπ: L=3 in (pol d,p).
1283.959 *24*	3/2−	B E	Jπ: 1283.952γ (E1) to 1/2+ g.s.; L=1 in (pol d,p).
1329.319 *18*	5/2+	B E	Jπ: 751.753γ M1 to 7/2+, 1329.33γ to 1/2+ g.s.; 445.3γ (E2) to 9/2+; direct population in ^{133}La ε decay (Jπ=5/2+).
1329.5 *5*	7/2−	E	Jπ: L=3 in (pol d,p).
1352.76 *5*	7/2+	B	Jπ: 1061.56γ M1+E2 to 5/2+ and 428.7γ M1 to 9/2+.
1375.65[#] *7*	11/2+	D	Jπ: 798.0γ E2 to 7/2+; 492.4γ (M1) to 9/2+.
1501.5 *5*		E	
1528.64 *9*	3/2,5/2+	B	Jπ: 1528.62γ to 1/2+; direct population in ^{133}La ε decay (Jπ=5/2+).
1528.99[g] *9*	15/2−	CD	Jπ: 627.3γ M1+E2 γ to 13/2−; band assignment.
1532.40 *8*	3/2,5/2,7/2+	B	Jπ: 1230.06γ to 3/2+, 1241.04γ to 5/2+; direct population in ^{133}La ε decay (Jπ=5/2+).
1563.399 *24*	5/2+	B E	Jπ: 932.98γ M1 to 5/2+, 1563.36γ to 1/2+; L=2 in (pol d,p).
1582.7 *5*	1/2−	E	Jπ: L=1 in (pol d,p).
1620.58 *3*	5/2+	B E	XREF: E(1616.1). Jπ: 1043.02γ M1 to 7/2+, 1620.9γ to 1/2+; direct population in ^{133}La ε decay (Jπ=5/2+).
1633.08[‡] *8*	13/2+	D	Jπ: 257.5γ M1+E2 to 11/2+, 749.6γ E2 to 9/2+.
1689.75 *6*	3/2+,5/2,7/2+	B	Jπ: 1387.41γ to 3/2+, 1111.9γ to 7/2+; direct population in ^{133}La ε decay (Jπ=5/2+).
1706.93 *16*	3/2,5/2+	B E	XREF: E(1704.7). Jπ: 1706.7γ to 1/2+; direct population in ^{133}La ε decay (Jπ=5/2+).
1712.75[e] *8*	17/2−	CD	Jπ: 743.8γ M1+E2 to 15/2−, 810.9γ E2 to 13/2−.
1769.61 *6*	3/2,5/2+	B	Jπ: 1769.6γ to 1/2+; 1478.72γ to 5/2+; direct population in ^{133}La ε decay (Jπ=5/2+).
1770.9 *5*	5/2−	E	Jπ: L=3 in (pol d,p).
1830.22 *3*	3/2,5/2+	B E	XREF: E(1833.7). Jπ: 1830.21γ to 1/2+; direct population in ^{133}La ε decay (Jπ=5/2+).
1859.11[d] *9*	19/2−	CD	Jπ: 146.4γ (M1) to 17/2−, 890.1γ E2 to 15/2−.
1872.4 *5*		E	
1938.3 *5*		E	

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Adopted Levels, Gammas (continued)

^{133}Ba Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
1942.07[a] *9*	19/2$^+$	3.5 ns *15*	CD	J$^\pi$: 229.2γ E1 to 17/2$^-$; band assignment. $T_{1/2}$: authors (1975Gi11) give 2 to 5 ns in ^{124}Sn(^{12}C,3nγ). configuration: Probable a mixture of $\nu(s^{-1}_{1/2},h^{-2}_{11/2})$ and $\nu(d^{-1}_{3/2},h^{-2}_{11/2})$.
1968.2 *5*	7/2$^-$		E	J$^\pi$: L=3 in (pol d,p).
2017.0 *5*			E	
2025.1 *5*			E	
2036.19 *11*	17/2$^-$		D	J$^\pi$: 507.2γ and 1067.2γ M1+E2 to 15/2$^-$.
2075.8 *5*	3/2$^-$		E	J$^\pi$: L=1 in (pol d,p).
2101.3 *5*			E	
2113.4 *5*	3/2$^-$		E	J$^\pi$: L=1 in (pol d,p).
2142.2 *5*	(7/2$^-$)		E	J$^\pi$: L=(3) in (pol d,p).
2170.74[g] *9*	19/2$^-$		CD	J$^\pi$: 458.0γ D to 17/2$^-$, stretched 641.9γ E2 (ΔJ=2) to 15/2$^-$.
2171.2 *5*	5/2$^-$		E	J$^\pi$: L=3 in (pol d,p).
2210.97[#] *10*	15/2$^+$		D	J$^\pi$: 577.9γ (M1) to 13/2$^+$, 835.3γ E2 to 11/2$^+$.
2223.0 *5*			E	
2245.3 *5*			E	
2266.9 *5*			E	
2288.1 *5*	7/2$^-$		E	J$^\pi$: L=3 in (pol d,p).
2325.3 *5*			E	
2338.8 *5*			E	
2366.04[a] *11*	23/2$^+$		CD	J$^\pi$: 432.9γ E2 to 19/2$^+$; band assignment.
2381.97[b] *14*	21/2$^+$		CD	J$^\pi$: 439.9γ M1+E2 to 19/2$^+$; band assignment.
2409 *20*			E	
2447.22[‡] *10*	17/2$^+$		D	J$^\pi$: 814.1γ E2 to 13/2$^+$; band assignment.
2495.99 *12*	(21/2$^+$)		CD	J$^\pi$: 554.0γ (M1+E2) to 19/2$^+$, decay pattern.
2509.26[g] *9*	21/2$^-$		CD	J$^\pi$: 650.2γ M1+E2 to 19/2$^-$, 796.5γ E2 to 17/2$^-$.
2526.47 *11*	19/2$^-$		D	J$^\pi$: 997.4γ E2 to 15/2$^-$, 813.8γ M1+E2 to 17/2$^-$.
2671.17[e] *11*	21/2$^-$		D	J$^\pi$: 958.3γ E2 to 17/2$^-$, 812.0γ (M1+E2) to 19/2$^-$.
2830.44[g] *10*	23/2$^-$		CD	J$^\pi$: 659.6γ E2 to 19/2$^-$, 321.3γ (M1) to 21/2$^-$.
2831.10[i] *12*	19/2$^{(+)}$		D	J$^\pi$: 1118.4γ stretched D to 17/2$^-$.
2862.15 *11*	21/2$^+$		D	J$^\pi$: 920.1γ (M1+E2) to 19/2$^+$, 252.9γ D (ΔJ=0) from 21/2$^+$.
2890.38[d] *10*	23/2$^-$		D	J$^\pi$: 1031.1γ E2 to 19/2$^-$, 219.2γ M1+E2 to 21/2$^-$.
2966.3 *4*	21/2$^-$		D	J$^\pi$: 930.0γ E2 to 17/2$^-$; 440.0γ to 19/2$^-$.
2978.2 *5*	19/2		CD	E(level): level fed by the 137.0γ from 21/2$^+$ level at 3115 keV.
3062.94[i] *11*	21/2$^{(+)}$		D	J$^\pi$: 1203.9γ D to 19/2$^-$, 231.9γ D to 19/2$^{(+)}$.
3103.80[b] *12*	25/2$^+$		CD	J$^\pi$: 737.8γ M1+E2 to 23/2$^+$.
3115.16[@] *9*	21/2$^+$		D	J$^\pi$: 667.9γ E2 to 17/2$^+$, and 1173.3γ D to 19/2$^+$; band assignment.
3246.51[&] *10*	23/2$^+$		CD	J$^\pi$: 1304.2γ E2 to 19/2$^+$, 131.4γ (M1) to 21/2$^+$.
3255.92[g] *10*	25/2$^-$		CD	J$^\pi$: 746.6γ E2 to 21/2$^-$, 425.5γ M1+E2 to 23/2$^-$.
3345.94[a] *12*	27/2$^+$		CD	J$^\pi$: 979.2γ E2 to 23/2$^+$; band assignment.
3373.60[i] *12*	23/2$^{(+)}$		D	J$^\pi$: 702.3γ (E1) to 21/2$^-$; 310.8γ to 21/2$^{(+)}$; band assignment.
3433.71[@] *12*	25/2$^+$		D	J$^\pi$: 187.2γ (M1) to 23/2$^+$; band assignment.
3545.92[g] *11*	27/2$^-$		D	J$^\pi$: 715.6γ E2 to 23/2$^-$, 290.0γ (M1) to 25/2$^-$.
3582.69[f] *11*	27/2$^-$		CD	J$^\pi$: 752.3γ E2 to 23/2$^-$, 326.8γ (M1) to 25/2$^-$; band assignment.
3646.41 *13*	(25/2)$^+$		D	J$^\pi$: 1280.3γ M1+E2 to 23/2$^+$.
3688.41[e] *14*	(25/2$^-$)		D	J$^\pi$: 798.0γ to 21/2$^-$, 1018.0γ to 21/2$^-$; band assignment.
3700.60[i] *16*	25/2$^{(+)}$		D	J$^\pi$: 327.0γ (M1) to 23/2$^{(+)}$; band assignment.
3709.90 *16*	(25/2)		D	J$^\pi$: 336.3γ D to 23/2$^{(+)}$.
3710.68[&] *12*	27/2$^+$		D	J$^\pi$: 276.9γ (M1) to 25/2$^+$; band assignment.
3838.92[b] *14*	29/2$^+$		D	J$^\pi$: 493.1γ (M1) to 27/2$^+$, 735.0γ to 25/2$^+$; band assignment.
3967.85 *15*			D	

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Adopted Levels, Gammas (continued)

^{133}Ba Levels (continued)

E(level)[†]	Jπ	XREF	Comments
3987.98[d] *14*	27/2⁻	D	Jπ: 1097.6γ E2 to 17/2⁻; band assignment.
4084.6[i] *4*	27/2(+)	D	Jπ: 384.0γ (M1) to 25/2(+), 711.0γ to 23/2(+); band assignment.
4145.58 *14*	29/2⁺	D	Jπ: 1041.8γ E2 to 25/2⁺, 799.6γ to 27/2⁺.
4179.06[@] *14*	29/2⁺	D	Jπ: 468.4γ (M1) to 27/2⁺; band assignment.
4194.42[g] *13*	29/2⁻	D	Jπ: 938.4γ E2 to 25/2⁻; band assignment.
4203.20[a] *14*	31/2⁺	D	Jπ: 857.2γ E2 to 27/2⁺; band assignment.
4223.82 *13*	(29/2⁺)	D	Jπ: 513.1γ (M1) to 27/2⁺.
4242.86[f] *12*	31/2⁻	D	Jπ: 660.1γ E2 to 27/2⁻; band assignment.
4255.82 *13*	29/2⁺	D	Jπ: 545.1γ (M1) to 27/2⁺, 1152.1γ to 25/2⁺.
4402.41 *15*	(27/2)	D	Jπ: 756.0γ to 25/2⁺; population intensity of this level in 124SN(13C,4NG).
4421.91[g] *12*	31/2⁻	D	Jπ: 839.4γ E2 to 27/2⁻; 227.4γ (M1) to 29/2⁻; band assignment.
4425.08 *13*	(27/2⁺)	D	Jπ: 778.6γ and 1321.3γ stretched D to 25/2⁺.
4485.34 *13*	31/2⁺	D	Jπ: 261.4γ (M1) to 29/2⁺, 774.7γ and 1139.3γ E2 to 27/2⁺.
4500.6[i] *7*	29/2(+)	D	Jπ: 416.0γ to 27/2(+); band assignment.
4502.44[&] *13*	31/2⁺	D	Jπ: 791.7γ E2 to 27/2⁺, 323.5γ (M1) to 29/2⁺; band assignment.
4633.61 *18*	(29/2)	D	Jπ: 1051.0γ to 27/2⁻.
4657.81[c] *12*	29/2⁻	D	Jπ: 1075.1γ M1+E2 to 27/2⁻, 1311.9γ D to 27/2⁺; band assignment.
4824.51[c] *15*	31/2⁻	D	Jπ: 166.7γ D to 29/2⁻; band assignment.
4830.57[b] *14*	33/2⁺	D	Jπ: 627.3γ (M1) to 31/2⁺; band assignment.
5001.45[@] *15*	33/2⁺	D	Jπ: 822.3γ E2 to 29/2⁺, 499.1γ (M1) to 31/2⁺; band assignment.
5058.11[c] *18*	33/2⁻	D	Jπ: 233.6γ (M1) to 31/2⁻; band assignment.
5174.16 *15*	33/2⁺	D	Jπ: 918.4γ E2 to 29/2⁺.
5242.24[a] *15*	35/2⁺	D	Jπ: 411.6γ (M1) to 33/2⁺, 1039.0γ E2 to 31/2⁺; band assignment.
5263.4[g] *6*	(33/2⁻)	D	Jπ: 1069.0γ to 29/2⁻; band assignment.
5350.41[c] *21*	35/2⁻	D	Jπ: 292.3γ (M1) to 33/2⁻; band assignment.
5391.72[g] *13*	35/2⁻	D	Jπ: 969.8γ and 1148.9γ E2 to 31/2⁻; band assignment.
5417.80[&] *14*	35/2⁺	D	Jπ: 915.5γ and 932.3γ E2 to 31/2⁺, 415.9γ (M1) to 33/2⁺; band assignment.
5430.11[h] *14*	33/2⁻	D	Jπ: 1187.2γ M1+E2 to 31/2⁻; band assignment.
5465.17 *17*	(35/2)⁺	D	Jπ: 634.6γ M1+E2 to 33/2⁺.
5520.56[f] *15*	35/2⁻	D	Jπ: 1278.0γ E2 to 31/2⁻; band assignment.
5661.86[h] *14*	35/2⁻	D	Jπ: 1419.0γ E2 to 31/2⁻; band assignment.
5735.61[c] *23*	37/2⁻	D	Jπ: 385.2γ to 33/2⁻; band assignment.
5858.16[b] *16*	37/2⁺	D	Jπ: 1027.7γ E2 to 33/2⁺, 615.8γ (M1) to 35/2⁺; band assignment.
5936.24[@] *16*	37/2⁺	D	Jπ: 518.3γ (M1) to 35/2⁺, 935.0γ to 33/2⁺; band assignment.
5983.71[h] *14*	37/2⁻	D	Jπ: 463.1γ and 592.1γ (M1) to 35/2⁻; band assignment.
6237.0[c] *3*	39/2⁻	D	Jπ: 501.4γ (M1) to 37/2⁻; band assignment.
6277.35[a] *17*	39/2⁺	D	Jπ: 419.2γ (M1) to 37/2⁺, 1035.1γ E2 to 35/2⁺; band assignment.
6307.92[h] *15*	39/2⁻	D	Jπ: 324.3γ (M1) to 37/2⁻, 916.2γ E2 to 35/2⁺; band assignment.
6366.90[g] *14*	39/2⁻	D	Jπ: 383.1γ to 37/2⁻, 846.4γ E2 to 35/2⁻; band assignment.
6425.78[&] *16*	39/2⁺	D	Jπ: 489.4γ to 37/2⁺, 1008.1γ E2 to 35/2⁺; band assignment.
6546.16 *19*		D	
6749.51[h] *16*	41/2⁻	D	Jπ: 382.5γ and 441.7γ (M1) to 39/2⁻; band assignment.
6818.0[c] *3*	41/2⁻	D	Jπ: 581.0γ (M1) to 39/2⁻, 1081.5γ to 37/2⁻; band assignment.
6955.08[@] *18*	41/2⁺	D	Jπ: 529.3γ to 39/2⁺; band assignment.
6980.56[b] *19*	(41/2⁺)	D	Jπ: 703.2γ to 39/2⁺; band assignment.
7217.71[h] *19*	43/2⁻	D	Jπ: 468.2γ (M1) to 41/2⁻; band assignment.
7421.0[c] *4*	43/2⁻	D	Jπ: 603.0γ (M1) to 41/2⁻, 1184.0γ to 39/2⁻; band assignment.
7431.38[&] *18*	(43/2⁺)	D	Jπ: 476.3γ to 41/2⁺, 1005.6γ to 39/2⁺; band assignment.

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Adopted Levels, Gammas (continued)

^{133}Ba Levels (continued)

E(level)[†]	Jπ	XREF	Comments
7585.86[a] *19*	43/2$^+$	D	Jπ: 1308.5γ to 39/2$^+$; band assignment.
8052.0[c] *5*	45/2$^-$	D	Jπ: 631.0γ (M1) to 43/2$^-$, 1234.0γ to 41/2$^-$; band assignment.

[†] From a least-squares fit to Eγ's.
[‡] Band(A): based on 1/2$^+$ state, α=+1/2; Dominant $\nu(s_{1/2})^{-1}$ configuration.
[#] Band(B): based on 3/2$^+$ state, α=−1/2; Dominant $\nu(d_{3/2})^{-1}$ configuration.
[@] Band(C): Based on 21/2$^+$ state, α=+1/2; probable configuration=$\nu(h_{11/2})^{-1}\otimes\pi(h^{-1}_{11/2},g^{-1}_{7/2})$.
[&] Band(D): Based on 23/2$^+$ state, α=−1/2; probable configuration=$\nu(h_{11/2})^{-1}\otimes\pi(h^{-1}_{11/2},g^{-1}_{7/2})$.
[a] Band(E): Based on 19/2$^+$ state, α=−1/2; probable a mixture of $\nu(s^{-1}_{1/2},h^{-2}_{11/2})$ and $\nu(d^{-1}_{3/2},h^{-2}_{11/2})$ configurations.
[b] Band(F): Based on 21/2$^+$ state, α=+1/2; probable a mixture of $\nu(s^{-1}_{1/2},h^{-2}_{11/2})$ and $\nu(d^{-1}_{3/2},h^{-2}_{11/2})$ configurations.
[c] Band(G): based on 29/2$^-$ state.
[d] Band(H): Based on 11/2$^-$ state, α=−1/2; configuration=$\nu(h_{11/2})^{-1}$.
[e] Band(I): Based on 13/2$^-$ state, α=+1/2; configuration=$\nu(h_{11/2})^{-1}$.
[f] Band(J): based on 27/2$^-$ state.
[g] Band(K): based on 15/2$^-$ state.
[h] Band(L): band L based on 33/2$^-$ state.
[i] Band(M): Based on 19/2$^{(+)}$ state; probable configuration=$\nu(h_{11/2})^{-1}\otimes\pi(h^{-1}_{11/2},d^{-1}_{5/2})$.

Adopted Levels, Gammas (continued)

γ(^{133}Ba)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	δ[@]	α[†]	Comments
12.327	3/2$^+$	12.327 *6*	100 *6*	0.0	1/2$^+$	M1+E2	≤0.013	69.5 *19*	B(M1)(W.u.)>0.023; B(E2)(W.u.)<18 α(L)=55.2 *15*; α(M)=11.4 *3*; α(N+..)=2.86 *8* α(N)=2.46 *7*; α(O)=0.373 *9*; α(P)=0.0261 *4* Mult.,δ: L1:L2:L3=100:9.6 20:3.1 15 (1965TH05); α(exp)=65 3 (1980Mi13); maximum possible E2 admixture of δ^2=1.6×10^{-4}.
288.252	11/2$^-$	275.925 *7*	100.000	12.327	3/2$^+$	M4		4.65	α(K)=3.34 *5*; α(L)=1.018 *15*; α(M)=0.229 *4*; α(N+..)=0.0565 *8* α(N)=0.0491 *7*; α(O)=0.00705 *10*; α(P)=0.000352 *5* B(M4)(W.u.)=1.67 *4* Mult.: other: K:L:M:N=100.0 *11*:31.5 *4*:6.68 *12*:1.78 *7* (1980VyZZ); α(K)exp=3.45 *20* and K/L+=2.55 *10* (1965Th05).
		288 *1*	0.036 *25*	0.0	1/2$^+$	[E5]		4.08 *11*	α(K)=1.53 *4*; α(L)=1.97 *6*; α(M)=0.461 *13*; α(N+..)=0.108 *3* α(N)=0.096 *3*; α(O)=0.0123 *4*; α(P)=0.0001057 *22* B(E5)(W.u.)=10 *7* E_γ,I_γ: from ^{124}Sn(^{12}C,3nγ).
291.188	5/2$^+$	278.835 *17*	100.0 *12*	12.327	3/2$^+$	M1+E2	0.9 *16*	0.0580 *11*	α(K)=0.0485 *21*; α(L)=0.0075 *10*; α(M)=0.00157 *22*; α(N+..)=0.00039 *5* α(N)=0.00034 *5*; α(O)=5.0×10^{-5} *5*; α(P)=3.0×10^{-6} *4* δ: calculated by evaluators with BrIccMixing program from ce(K)=100×10^1 *15*, ce(L)=145 *25*, and ce(M)=35 *6* (1966Ha23).
		291.17 *5*	17.4 *3*	0.0	1/2$^+$	(E2)		0.0497	α(K)=0.0403 *6*; α(L)=0.00743 *11*; α(M)=0.001568 *22*; α(N+..)=0.000382 *6* α(N)=0.000332 *5*; α(O)=4.76×10^{-5} *7*; α(P)=2.28×10^{-6} *4*
302.395	3/2$^+$	290.06 *5*	85.7 *8*	12.327	3/2$^+$	M1+E2	1.0 *12*	0.0516 *15*	α(K)=0.0431 *24*; α(L)=0.0067 *8*; α(M)=0.00141 *19*; α(N+..)=0.00035 *4* α(N)=0.00030 *4*; α(O)=4.4×10^{-5} *4*; α(P)=2.6×10^{-6} *4* δ: Calculated by evaluators with BrIccMixing program from ce(K)=520 *80*, ce(L1)=70 *10* and ce(M)=18 *3* (1966Ha23).
		302.38 *4*	100.0 *11*	0.0	1/2$^+$	M1		0.0475	α(K)=0.0408 *6*; α(L)=0.00534 *8*; α(M)=0.001098 *16*; α(N+..)=0.000276 *4* α(N)=0.000237 *4*; α(O)=3.63×10^{-5} *5*; α(P)=2.66×10^{-6} *4*
539.799	1/2$^+$	527.464 *15*	100	12.327	3/2$^+$	M1,E2		0.0100 *16*	α(K)=0.0085 *14*; α(L)=0.00117 *11*; α(M)=0.000242 *21*; α(N+..)=6.0×10^{-5} *6* α(N)=5.2×10^{-5} *5*; α(O)=7.9×10^{-6} *9*; α(P)=5.4×10^{-7} *11*
577.555	7/2$^+$	286.4 *4*	5.65 *19*	291.188	5/2$^+$	M1+E2		0.0536 *14*	α(K)=0.0447 *24*; α(L)=0.0070 *9*; α(M)=0.00147 *20*; α(N+..)=0.00036 *5* α(N)=0.00031 *4*; α(O)=4.6×10^{-5} *5*; α(P)=2.7×10^{-6} *4*
		565.231 *20*	100 *2*	12.327	3/2$^+$	E2		0.00708 *10*	α=0.00708 *10*; α(K)=0.00598 *9*; α(L)=0.000872 *13*; α(M)=0.000181 *3*; α(N+..)=4.49×10^{-5} *7* α(N)=3.87×10^{-5} *6*; α(O)=5.78×10^{-6} *8*; α(P)=3.63×10^{-7} *5*

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Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
630.568	5/2+	328.18 *3*	3.62 *21*	302.395	3/2+	M1+E2	0.0362 *23*	α(K)=0.030 *3*; α(L)=0.0046 *3*; α(M)=0.00095 *8*; α(N+..)=0.000236 *15* α(N)=0.000204 *14*; α(O)=3.04×10^{-5} *12*; α(P)=1.9×10^{-6} *3*
		339.35 *4*	5.0 *5*	291.188	5/2+	M1+E2	0.0329 *23*	α(K)=0.028 *3*; α(L)=0.00414 *21*; α(M)=0.00086 *6*; α(N+..)=0.000213 *11* α(N)=0.000184 *10*; α(O)=2.74×10^{-5} *8*; α(P)=1.7×10^{-6} *3*
		618.241 *11*	100 *3*	12.327	3/2+	M1	0.00781 *11*	α=0.00781 *11*; α(K)=0.00673 *10*; α(L)=0.000859 *12*; α(M)=0.0001764 *25*; α(N+..)=4.44×10^{-5} α(N)=3.81×10^{-5} *6*; α(O)=5.85×10^{-6} *9*; α(P)=4.34×10^{-7} *6*
		630.578 *25*	17.0 *6*	0.0	1/2+	E2	0.00533 *8*	α=0.00533 *8*; α(K)=0.00452 *7*; α(L)=0.000643 *9*; α(M)=0.0001332 *19*; α(N+..)=3.31×10^{-5} *5* α(N)=2.85×10^{-5} *4*; α(O)=4.27×10^{-6} *6*; α(P)=2.76×10^{-7} *4*
676.488	3/2+,5/2+	136.7 *2*	21 *8*	539.799	1/2+	M1,E2	0.52 *12*	α(K)=0.40 *6*; α(L)=0.10 *5*; α(M)=0.020 *11*; α(N+..)=0.005 *3* α(N)=0.0043 *23*; α(O)=0.0006 *3*; α(P)=2.27×10^{-5} *5*
		374.13 *9*	8.8 *13*	302.395	3/2+			
		385.295 *14*	82 *3*	291.188	5/2+	M1+E2	0.0231 *23*	α(K)=0.0196 *23*; α(L)=0.00283 *4*; α(M)=0.000588 *10*; α(N+..)=0.0001461 *21* α(N)=0.0001260 *18*; α(O)=1.89×10^{-5} *5*; α(P)=1.22×10^{-6} *21*
		664.21 *13*	100 *4*	12.327	3/2+	M1+E2	0.0056 *10*	α=0.0056 *10*; α(K)=0.0048 *9*; α(L)=0.00064 *9*; α(M)=0.000132 *17*; α(N+..)=3.3×10^{-5} *5* α(N)=2.8×10^{-5} *4*; α(O)=4.3×10^{-6} *6*; α(P)=3.0×10^{-7} *6*
		676.47 *2*	29 *8*	0.0	1/2+	M1,E2	0.0054 *9*	α=0.0054 *9*; α(K)=0.0046 *8*; α(L)=0.00061 *8*; α(M)=0.000126 *16*; α(N+..)=3.1×10^{-5} *5* α(N)=2.7×10^{-5} *4*; α(O)=4.1×10^{-6} *6*; α(P)=2.9×10^{-7} *6*
858.499	3/2+	227.82 *6*	1.6 *3*	630.568	5/2+	M1+E2	0.106 *6*	α(K)=0.0870 *15*; α(L)=0.015 *4*; α(M)=0.0031 *8*; α(N+..)=0.00077 *18* α(N)=0.00067 *16*; α(O)=9.7×10^{-5} *20*; α(P)=5.2×10^{-6} *5*
		556.03 *22*	30 *6*	302.395	3/2+	M1+E2	0.0088 *14*	α=0.0088 *14*; α(K)=0.0075 *13*; α(L)=0.00102 *11*; α(M)=0.000210 *20*; α(N+..)=5.2×10^{-5} *6* α(N)=4.5×10^{-5} *5*; α(O)=6.8×10^{-6} *8*; α(P)=4.7×10^{-7} *10*
		567.26 *4*	45 *2*	291.188	5/2+	M1+E2	0.0083 *14*	α=0.0083 *14*; α(K)=0.0071 *12*; α(L)=0.00096 *10*; α(M)=0.000199 *20*; α(N+..)=5.0×10^{-5} *6* α(N)=4.3×10^{-5} *5*; α(O)=6.5×10^{-6} *8*; α(P)=4.5×10^{-7} *9*
		846.183 *15*	100 *3*	12.327	3/2+	M1+E2	0.0032 *6*	α=0.0032 *6*; α(K)=0.0027 *5*; α(L)=0.00035 *5*; α(M)=7.2×10^{-5} *11*; α(N+..)=1.8×10^{-5} *3* α(N)=1.56×10^{-5} *23*; α(O)=2.4×10^{-6} *4*; α(P)=1.7×10^{-7} *4*
		858.496 *15*	82 *3*	0.0	1/2+	M1+E2	0.0031 *6*	α=0.0031 *6*; α(K)=0.0026 *5*; α(L)=0.00034 *5*; α(M)=7.0×10^{-5} *10*; α(N+..)=1.8×10^{-5} *3* α(N)=1.51×10^{-5} *22*; α(O)=2.3×10^{-6} *4*; α(P)=1.7×10^{-7} *4*
862.80	(7/2)+	560.28 *21*	68 *19*	302.395	3/2+			
		571.9 *3*	100 *9*	291.188	5/2+	M1,E2	0.0082 *13*	α=0.0082 *13*; α(K)=0.0070 *12*; α(L)=0.00094 *10*; α(M)=0.000195 *20*; α(N+..)=4.9×10^{-5} *6* α(N)=4.2×10^{-5} *5*; α(O)=6.3×10^{-6} *8*; α(P)=4.4×10^{-7} *9*
		850.43 *10*	90 *10*	12.327	3/2+	E2	0.0031 *6*	α=0.0031 *6*; α(K)=0.0027 *5*; α(L)=0.00035 *5*; α(M)=7.1×10^{-5} *10*;

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Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
								α(N+..)=1.8×10^{-5} *3* α(N)=1.54×10^{-5} *22*; α(O)=2.4×10^{-6} *4*; α(P)=1.7×10^{-7} *4*
883.39	9/2$^+$	305.9[#] *1*	11[#] *3*	577.555	7/2$^+$	(M1)	0.0461	α(K)=0.0396 *6*; α(L)=0.00517 *8*; α(M)=0.001065 *15*; α(N+..)=0.000268 *4* α(N)=0.000230 *4*; α(O)=3.52×10^{-5} *5*; α(P)=2.58×10^{-6} *4*
		592.22 *5*	100 *6*	291.188	5/2$^+$	E2	0.00626 *9*	α=0.00626 *9*; α(K)=0.00530 *8*; α(L)=0.000764 *11*; α(M)=0.0001586 *23*; α(N+..)=3.93×10^{-5} *6* α(N)=3.39×10^{-5} *5*; α(O)=5.07×10^{-6} *8*; α(P)=3.23×10^{-7} *5*
887.135	5/2$^+$	210.54 *6*	1.3 *3*	676.488	3/2$^+$,5/2$^+$	M1,E2	0.135 *11*	α(K)=0.110 *4*; α(L)=0.020 *6*; α(M)=0.0041 *13*; α(N+..)=0.0010 *3* α(N)=0.00087 *25*; α(O)=0.00013 *3*; α(P)=6.5×10^{-6} *5*
		256.57 *6*	5.7 *4*	630.568	5/2$^+$	M1,E2	0.0741 *14*	α(K)=0.0614 *17*; α(L)=0.0100 *18*; α(M)=0.0021 *4*; α(N+..)=0.00052 *9* α(N)=0.00045 *8*; α(O)=6.6×10^{-5} *10*; α(P)=3.7×10^{-6} *4*
		309.56 *5*	3.5 *3*	577.555	7/2$^+$	M1,E2	0.0428 *20*	α(K)=0.036 *3*; α(L)=0.0055 *5*; α(M)=0.00115 *12*; α(N+..)=0.000283 *25* α(N)=0.000245 *23*; α(O)=3.63×10^{-5} *22*; α(P)=2.2×10^{-6} *3*
		347.1 *3*	0.8 *4*	539.799	1/2$^+$			
		584.734 *10*	44.1 *15*	302.395	3/2$^+$	M1+E2	0.0077 *13*	α=0.0077 *13*; α(K)=0.0066 *12*; α(L)=0.00089 *10*; α(M)=0.000183 *20*; α(N+..)=4.6×10^{-5} *6* α(N)=3.9×10^{-5} *5*; α(O)=6.0×10^{-6} *8*; α(P)=4.2×10^{-7} *9*
		595.94 *9*	100 *3*	291.188	5/2$^+$	M1(+E2)	0.0074 *12*	α=0.0074 *12*; α(K)=0.0063 *11*; α(L)=0.00085 *10*; α(M)=0.000174 *19*; α(N+..)=4.4×10^{-5} *5* α(N)=3.8×10^{-5} *5*; α(O)=5.7×10^{-6} *8*; α(P)=4.0×10^{-7} *8*
		874.83 *3*	10.4 *5*	12.327	3/2$^+$	M1,E2	0.0029 *5*	α=0.0029 *5*; α(K)=0.0025 *5*; α(L)=0.00032 *5*; α(M)=6.7×10^{-5} *10*; α(N+..)=1.67×10^{-5} *25* α(N)=1.44×10^{-5} *21*; α(O)=2.2×10^{-6} *4*; α(P)=1.6×10^{-7} *3*
		887.164 *24*	5.53 *25*	0.0	1/2$^+$			
901.80	13/2$^-$	613.6[#] *1*	100[#]	288.252	11/2$^-$	M1+E2	0.0068 *12*	α=0.0068 *12*; α(K)=0.0058 *10*; α(L)=0.00078 *10*; α(M)=0.000162 *19*; α(N+..)=4.0×10^{-5} *5* α(N)=3.5×10^{-5} *4*; α(O)=5.3×10^{-6} *7*; α(P)=3.7×10^{-7} *8*
923.957	5/2$^+$	293.17[a] *11*	2.6 *5*	630.568	5/2$^+$	M1,E2	0.0501 *16*	α(K)=0.0419 *25*; α(L)=0.0065 *8*; α(M)=0.00136 *17*; α(N+..)=0.00034 *4* α(N)=0.00029 *4*; α(O)=4.3×10^{-5} *4*; α(P)=2.6×10^{-6} *4*
		621.542 *14*	55.1 *13*	302.395	3/2$^+$	M1,E2	0.0066 *11*	α=0.0066 *11*; α(K)=0.0057 *10*; α(L)=0.00076 *9*; α(M)=0.000156 *18*; α(N+..)=3.9×10^{-5} *5* α(N)=3.4×10^{-5} *4*; α(O)=5.1×10^{-6} *7*; α(P)=3.6×10^{-7} *8*
		632.765 *8*	100 *3*	291.188	5/2$^+$	M1	0.00738 *11*	α=0.00738 *11*; α(K)=0.00636 *9*; α(L)=0.000812 *12*; α(M)=0.0001666 *24*; α(N+..)=4.19×10^{-5} *6* α(N)=3.60×10^{-5} *5*; α(O)=5.53×10^{-6} *8*; α(P)=4.10×10^{-7} *6*
		911.647 *13*	10.0 *4*	12.327	3/2$^+$	M1,E2	0.0027 *5*	α=0.0027 *5*; α(K)=0.0023 *4*; α(L)=0.00029 *5*; α(M)=6.1×10^{-5} *9*; α(N+..)=1.52×10^{-5} *22* α(N)=1.30×10^{-5} *19*; α(O)=2.0×10^{-6} *3*; α(P)=1.4×10^{-7} *3*
		923.9 *2*	2.31 *13*	0.0	1/2$^+$			

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Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
968.97	15/2$^-$	680.7[#] *1*	100[#]	288.252	11/2$^-$	E2	0.00440 *7*	α=0.00440 *7*; α(K)=0.00374 *6*; α(L)=0.000523 *8*; α(M)=0.0001083 *16*; α(N+..)=2.69×10^{-5} *4* α(N)=2.32×10^{-5} *4*; α(O)=3.49×10^{-6} *5*; α(P)=2.30×10^{-7} *4*
1021.584	3/2$^+$	158.4 *3*	2.5 *11*	862.80	(7/2)$^+$	E2	0.33 *6*	α(K)=0.26 *3*; α(L)=0.055 *24*; α(M)=0.012 *6*; α(N+..)=0.0028 *12* α(N)=0.0024 *11*; α(O)=0.00035 *14*; α(P)=1.48×10^{-5} *5*
		345.1 *4*	2.1 *18*	676.488	3/2$^+$,5/2$^+$			
		481.73 *3*	50 *3*	539.799	1/2$^+$	M1,E2	0.0127 *18*	α(K)=0.0108 *17*; α(L)=0.00150 *11*; α(M)=0.000310 *20*; α(N+..)=7.7×10^{-5} *6* α(N)=6.7×10^{-5} *5*; α(O)=1.00×10^{-5} *9*; α(P)=6.8×10^{-7} *13*
		719.44 *14*	5.0 *11*	302.395	3/2$^+$			
		1009.31 *4*	100 *5*	12.327	3/2$^+$	M1	0.00244 *4*	α=0.00244 *4*; α(K)=0.00211 *3*; α(L)=0.000265 *4*; α(M)=5.44×10^{-5} *8*; α(N+..)=1.369×10^{-5} *20* α(N)=1.175×10^{-5} *17*; α(O)=1.81×10^{-6} *3*; α(P)=1.352×10^{-7} *19*
		1021.62 *5*	7.7 *5*	0.0	1/2$^+$			
1112.346	3/2$^+$,5/2$^+$,7/2$^+$	435.82 *3*	13.3 *8*	676.488	3/2$^+$,5/2$^+$	E2(+M1)	0.0165 *21*	α(K)=0.0140 *20*; α(L)=0.00198 *9*; α(M)=0.000411 *15*; α(N+..)=0.000102 *5* α(N)=8.8×10^{-5} *4*; α(O)=1.33×10^{-5} *9*; α(P)=8.8×10^{-7} *16*
		534.796 *10*	26.0 *9*	577.555	7/2$^+$	M1,E2	0.0097 *15*	α=0.0097 *15*; α(K)=0.0083 *14*; α(L)=0.00113 *11*; α(M)=0.000233 *21*; α(N+..)=5.8×10^{-5} *6* α(N)=5.0×10^{-5} *5*; α(O)=7.6×10^{-6} *9*; α(P)=5.2×10^{-7} *11*
		809.976 *19*	22.0 *8*	302.395	3/2$^+$	M1,E2	0.0035 *6*	α=0.0035 *6*; α(K)=0.0030 *6*; α(L)=0.00039 *6*; α(M)=8.0×10^{-5} *12*; α(N+..)=2.0×10^{-5} *3* α(N)=1.73×10^{-5} *25*; α(O)=2.6×10^{-6} *4*; α(P)=1.9×10^{-7} *4*
		821.13 *3*	6.5 *4*	291.188	5/2$^+$	M1	0.00395 *6*	α=0.00395 *6*; α(K)=0.00341 *5*; α(L)=0.000432 *6*; α(M)=8.86×10^{-5} *13*; α(N+..)=2.23×10^{-5} *4* α(N)=1.91×10^{-5} *3*; α(O)=2.94×10^{-6} *5*; α(P)=2.19×10^{-7} *3*
		1099.99 *2*	100 *5*	12.327	3/2$^+$	E2(+M1)	0.0017 *3*	α=0.0017 *3*; α(K)=0.00150 *24*; α(L)=0.00019 *3*; α(M)=3.9×10^{-5} *6*; α(N+..)=9.8×10^{-6} *15* α(N)=8.4×10^{-6} *12*; α(O)=1.29×10^{-6} *19*; α(P)=9.5×10^{-8} *16*
		1111.9[a] *4*	1.2 *5*	0.0	1/2$^+$			
1211.792	3/2$^+$,5/2$^+$	324.76 *10*	18 *3*	887.135	5/2$^+$			
		353.28 *4*	53 *4*	858.499	3/2$^+$	E2(+M1)	0.0294 *24*	α(K)=0.0248 *25*; α(L)=0.00366 *13*; α(M)=0.00076 *4*; α(N+..)=0.000189 *7* α(N)=0.000163 *6*; α(O)=2.43×10^{-5} *4*; α(P)=1.54×10^{-6} *24*
		581.39 *8*	27 *3*	630.568	5/2$^+$	M1,E2	0.0078 *13*	α=0.0078 *13*; α(K)=0.0067 *12*; α(L)=0.00090 *10*; α(M)=0.000186 *20*; α(N+..)=4.7×10^{-5} *6* α(N)=4.0×10^{-5} *5*; α(O)=6.1×10^{-6} *8*; α(P)=4.2×10^{-7} *9*
		671.997 *17*	80 *17*	539.799	1/2$^+$	M1,E2	0.0055 *10*	α=0.0055 *10*; α(K)=0.0047 *9*; α(L)=0.00062 *8*; α(M)=0.000128 *16*; α(N+..)=3.2×10^{-5} *5* α(N)=2.8×10^{-5} *4*; α(O)=4.2×10^{-6} *6*; α(P)=3.0×10^{-7} *6*

$^{133}_{56}Ba_{77}$-9

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
1211.792	3/2$^+$,5/2$^+$	909.27 *8*	21.6 *11*	302.395	3/2$^+$	M1	0.00311 *5*	α=0.00311 *5*; α(K)=0.00269 *4*; α(L)=0.000339 *5*; α(M)=6.95×10^{-5} *10*; α(N+..)=1.749×10^{-5} *25* α(N)=1.501×10^{-5} *21*; α(O)=2.31×10^{-6} *4*; α(P)=1.724×10^{-7} *25*
		920.623 *24*	43.8 *11*	291.188	5/2$^+$	M1	0.00302 *5*	α=0.00302 *5*; α(K)=0.00261 *4*; α(L)=0.000329 *5*; α(M)=6.75×10^{-5} *10*; α(N+..)=1.699×10^{-5} *24* α(N)=1.458×10^{-5} *21*; α(O)=2.24×10^{-6} *4*; α(P)=1.675×10^{-7} *24*
		1199.447 *22*	47 *3*	12.327	3/2$^+$	M1	0.001653 *24*	α=0.001653 *24*; α(K)=0.001423 *20*; α(L)=0.0001780 *25*; α(M)=3.65×10^{-5} *6*; α(N+..)=1.517×10^{-5} α(N)=7.88×10^{-6} *11*; α(O)=1.213×10^{-6} *17*; α(P)=9.09×10^{-8} *13*; α(IPF)=5.99×10^{-6} *9*
		1211.760 *25*	100 *6*	0.0	1/2$^+$	M1,E2	0.00142 *21*	α=0.00142 *21*; α(K)=0.00122 *18*; α(L)=0.000154 *21*; α(M)=3.2×10^{-5} *5*; α(N+..)=1.55×10^{-5} *10* α(N)=6.8×10^{-6} *9*; α(O)=1.04×10^{-6} *15*; α(P)=7.7×10^{-8} *13*; α(IPF)=7.58×10^{-6} *19*
1283.959	3/2$^-$	1283.952 *24*	100	0.0	1/2$^+$	(E1)	0.000555 *8*	α=0.000555 *8*; α(K)=0.000419 *6*; α(L)=5.10×10^{-5} *8*; α(M)=1.041×10^{-5} *15*; α(N+..)=7.49×10^{-5} *11* α(N)=2.24×10^{-6} *4*; α(O)=3.44×10^{-7} *5*; α(P)=2.56×10^{-8} *4*; α(IPF)=7.22×10^{-5} *11*
1329.319	5/2$^+$	441.9[a] *4*	4 *3*	887.135	5/2$^+$	M1,E2	0.0159 *20*	α(K)=0.0135 *19*; α(L)=0.00191 *9*; α(M)=0.000395 *16*; α(N+..)=9.8×10^{-5} *5* α(N)=8.5×10^{-5} *4*; α(O)=1.28×10^{-5} *9*; α(P)=8.5×10^{-7} *16*
		445.3 *3*	9 *5*	883.39	9/2$^+$	(E2)	0.01365	α(K)=0.01141 *17*; α(L)=0.00178 *3*; α(M)=0.000371 *6*; α(N+..)=9.15×10^{-5} *13* α(N)=7.92×10^{-5} *12*; α(O)=1.166×10^{-5} *17*; α(P)=6.79×10^{-7} *10*
		653.04 *11*	21 *4*	676.488	3/2$^+$,5/2$^+$			
		751.753 *15*	100 *2*	577.555	7/2$^+$	M1	0.00488 *7*	α=0.00488 *7*; α(K)=0.00421 *6*; α(L)=0.000534 *8*; α(M)=0.0001095 *16*; α(N+..)=2.76×10^{-5} *4* α(N)=2.36×10^{-5} *4*; α(O)=3.64×10^{-6} *5*; α(P)=2.71×10^{-7} *4*
		1038.18 *5*	13.8 *10*	291.188	5/2$^+$	M1	0.00229 *4*	α=0.00229 *4*; α(K)=0.00198 *3*; α(L)=0.000248 *4*; α(M)=5.09×10^{-5} *8*; α(N+..)=1.282×10^{-5} *18* α(N)=1.100×10^{-5} *16*; α(O)=1.693×10^{-6} *24*; α(P)=1.266×10^{-7} *18*
		1317.24[a] *5*	47 *4*	12.327	3/2$^+$			
		1329.33 *5*	17.4 *15*	0.0	1/2$^+$			
1352.76	7/2$^+$	428.70 *20*	5.0 *18*	923.957	5/2$^+$	M1	0.0194	α(K)=0.01665 *24*; α(L)=0.00215 *3*; α(M)=0.000443 *7*; α(N+..)=0.0001113 *16* α(N)=9.56×10^{-5} *14*; α(O)=1.467×10^{-5} *21*; α(P)=1.081×10^{-6} *16*
		465.53 *11*	12.4 *18*	887.135	5/2$^+$			
		469.41 *5*	25.2 *18*	883.39	9/2$^+$	M1	0.01541	α(K)=0.01326 *19*; α(L)=0.001709 *24*; α(M)=0.000351 *5*; α(N+..)=8.84×10^{-5} *13* α(N)=7.58×10^{-5} *11*; α(O)=1.164×10^{-5} *17*; α(P)=8.60×10^{-7} *12*
		494.5[a] *3*	3.6 *18*	858.499	3/2$^+$			

$^{133}_{56}Ba_{77}$-10

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
1352.76	7/2+	722.01 *15*	3.8 *7*	630.568	5/2+			
		775.31 *18*	3.2 *7*	577.555	7/2+	M1	0.00453 *7*	α=0.00453 *7*; α(K)=0.00391 *6*; α(L)=0.000495 *7*; α(M)=0.0001017 *15*; α(N+..)=2.56×10^{-5} *4* α(N)=2.20×10^{-5} *3*; α(O)=3.38×10^{-6} *5*; α(P)=2.51×10^{-7} *4*
		1061.56 *22*	100 *7*	291.188	5/2+	M1+E2	0.0019 *3*	α=0.0019 *3*; α(K)=0.0016 *3*; α(L)=0.00021 *3*; α(M)=4.2×10^{-5} *6*; α(N+..)=1.07×10^{-5} *16* α(N)=9.2×10^{-6} *13*; α(O)=1.40×10^{-6} *21*; α(P)=1.03×10^{-7} *18*
		1340.2 *3*	5.3 *9*	12.327	3/2+			
1375.65	11/2+	492.4[#] *1*	19[#] *6*	883.39	9/2+	(M1)	0.01367	α(K)=0.01177 *17*; α(L)=0.001515 *22*; α(M)=0.000311 *5*; α(N+..)=7.83×10^{-5} *11* α(N)=6.72×10^{-5} *10*; α(O)=1.032×10^{-5} *15*; α(P)=7.63×10^{-7} *11*
		798.0[#] *1*	100[#] *13*	577.555	7/2+	E2	0.00301 *5*	α=0.00301 *5*; α(K)=0.00257 *4*; α(L)=0.000348 *5*; α(M)=7.19×10^{-5} *10*; α(N+..)=1.79×10^{-5} *3* α(N)=1.543×10^{-5} *22*; α(O)=2.33×10^{-6} *4*; α(P)=1.584×10^{-7} *23*
1528.64	3/2,5/2+	1516.34 *20*	47 *13*	12.327	3/2+			
		1528.62 *10*	100 *13*	0.0	1/2+			
1528.99	15/2−	560.0[#] *1*	23.0[#] *9*	968.97	15/2−	D		
		627.3[##] *1*	100[##] *4*	901.80	13/2−	M1+E2	0.0065 *11*	α=0.0065 *11*; α(K)=0.0055 *10*; α(L)=0.00074 *9*; α(M)=0.000153 *18*; α(N+..)=3.8×10^{-5} *5* α(N)=3.3×10^{-5} *4*; α(O)=5.0×10^{-6} *7*; α(P)=3.5×10^{-7} *7*
1532.40	3/2,5/2,7/2+	1230.06 *9*	100 *13*	302.395	3/2+			
		1241.04 *15*	58 *10*	291.188	5/2+			
1563.399	5/2+	932.98 *7*	52 *4*	630.568	5/2+	M1	0.00293 *5*	α=0.00293 *5*; α(K)=0.00253 *4*; α(L)=0.000319 *5*; α(M)=6.54×10^{-5} *10*; α(N+..)=1.646×10^{-5} *23* α(N)=1.413×10^{-5} *20*; α(O)=2.17×10^{-6} *3*; α(P)=1.623×10^{-7} *23*
		1261.01 *3*	100 *6*	302.395	3/2+			
		1550.97 *5*	42 *3*	12.327	3/2+			
		1563.36 *6*	37 *3*	0.0	1/2+			
1620.58	5/2+	733.63[a] *10*	5.6 *9*	887.135	5/2+			
		1043.02 *4*	19.7 *18*	577.555	7/2+	M1	0.00227 *4*	α=0.00227 *4*; α(K)=0.00196 *3*; α(L)=0.000246 *4*; α(M)=5.04×10^{-5} *7*; α(N+..)=1.268×10^{-5} *18* α(N)=1.088×10^{-5} *16*; α(O)=1.674×10^{-6} *24*; α(P)=1.253×10^{-7} *18*
		1080.9 *1*	7.8 *12*	539.799	1/2+			
		1329.33 *5*	20.4 *18*	291.188	5/2+			
		1608.36 *13*	100 *6*	12.327	3/2+			
		1620.9 *7*	3.0 *12*	0.0	1/2+			
1633.08	13/2+	257.5[#] *1*	<9.5[#]	1375.65	11/2+	M1+E2	0.0733 *13*	α(K)=0.0608 *17*; α(L)=0.0099 *18*; α(M)=0.0021 *4*; α(N+..)=0.00051 *9* α(N)=0.00044 *8*; α(O)=6.5×10^{-5} *10*; α(P)=3.7×10^{-6} *4*
		749.6[#] *1*	100[#] *10*	883.39	9/2+	E2	0.00348 *5*	α=0.00348 *5*; α(K)=0.00297 *5*; α(L)=0.000407 *6*; α(M)=8.42×10^{-5}

$^{133}_{56}Ba_{77}$-11

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
								12; α(N+..)=2.10×10^{-5} *3* α(N)=1.81×10^{-5} *3*; α(O)=2.72×10^{-6} *4*; α(P)=1.83×10^{-7} *3*
1689.75	3/2$^+$,5/2,7/2$^+$	802.3 *4*	63 *30*	887.135	5/2$^+$			
		1111.9[a] *4*	47 *25*	577.555	7/2$^+$			
		1387.41 *7*	72 *8*	302.395	3/2$^+$			
		1398.49 *8*	100 *11*	291.188	5/2$^+$			
		1677.01[a] *9*		12.327	3/2$^+$			
1706.93	3/2,5/2$^+$	848.4 *3*	100 *20*	858.499	3/2$^+$			
		1404.7 *4*	34 *5*	302.395	3/2$^+$			
		1415.9 *3*	47 *5*	291.188	5/2$^+$			
		1694.4 *4*	52 *4*	12.327	3/2$^+$			
		1706.7 *4*	11 *3*	0.0	1/2$^+$			
1712.75	17/2$^-$	743.8[#] *1*	100[#] *3*	968.97	15/2$^-$	M1+E2	0.0043 *8*	α=0.0043 *8*; α(K)=0.0037 *7*; α(L)=0.00048 *7*; α(M)=9.9×10^{-5} *14*; α(N+..)=2.5×10^{-5} *4* α(N)=2.1×10^{-5} *3*; α(O)=3.3×10^{-6} *5*; α(P)=2.3×10^{-7} *5*
		810.9[#] *1*	43.6[#] *13*	901.80	13/2$^-$	E2	0.00290 *4*	α=0.00290 *4*; α(K)=0.00247 *4*; α(L)=0.000335 *5*; α(M)=6.91×10^{-5} *10*; α(N+..)=1.723×10^{-5} *25* α(N)=1.483×10^{-5} *21*; α(O)=2.24×10^{-6} *4*; α(P)=1.527×10^{-7} *22*
1769.61	3/2,5/2$^+$	1467.28 *13*	30 *4*	302.395	3/2$^+$			
		1478.72[a] *9*	28 *3*	291.188	5/2$^+$			
		1757.06 *20*	25 *4*	12.327	3/2$^+$			
		1769.60 *7*	100 *8*	0.0	1/2$^+$			
1830.22	3/2,5/2$^+$	1818.1 *4*	83 *17*	12.327	3/2$^+$			
		1830.21 *3*	100 *33*	0.0	1/2$^+$			
1859.11	19/2$^-$	146.4[#] *1*	0.82[#] *5*	1712.75	17/2$^-$	(M1)	0.337	α(K)=0.289 *4*; α(L)=0.0385 *6*; α(M)=0.00795 *12*; α(N+..)=0.00200 *3* α(N)=0.001714 *25*; α(O)=0.000262 *4*; α(P)=1.90×10^{-5} *3*
		890.1[#] *1*	100[#] *3*	968.97	15/2$^-$	E2	0.00234 *4*	α=0.00234 *4*; α(K)=0.00200 *3*; α(L)=0.000267 *4*; α(M)=5.50×10^{-5} *8*; α(N+..)=1.375×10^{-5} *20* α(N)=1.183×10^{-5} *17*; α(O)=1.79×10^{-6} *3*; α(P)=1.240×10^{-7} *18*
1942.07	19/2$^+$	83.1[#] *1*	100[#] *10*	1859.11	19/2$^-$	(E1)	0.379	B(E1)(W.u.)=9.E−5 *4* α(K)=0.323 *5*; α(L)=0.0448 *7*; α(M)=0.00918 *14*; α(N+..)=0.00224 *4* α(N)=0.00194 *3*; α(O)=0.000283 *4*; α(P)=1.638×10^{-5} *24*
		229.2[#] *1*	11.00[#] *19*	1712.75	17/2$^-$	E1	0.0232	α(K)=0.0199 *3*; α(L)=0.00258 *4*; α(M)=0.000529 *8*; α(N+..)=0.0001313 *19* α(N)=0.0001132 *16*; α(O)=1.701×10^{-5} *24*; α(P)=1.138×10^{-6} *16* B(E1)(W.u.)=4.5×10^{-7} *20*
2036.19	17/2$^-$	507.2[#] *1*	50[#] *10*	1528.99	15/2$^-$	M1+E2	0.0111 *17*	α(K)=0.0095 *15*; α(L)=0.00130 *11*; α(M)=0.000269 *21*; α(N+..)=6.7×10^{-5} *6* α(N)=5.8×10^{-5} *5*; α(O)=8.7×10^{-6} *9*; α(P)=5.9×10^{-7} *12*

$^{133}_{56}Ba_{77}$-12

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
2036.19	17/2$^-$	1067.2[#] *1*	100[#]	968.97	15/2$^-$	M1+E2	0.0019 *3*	α=0.0019 *3*; α(K)=0.0016 *3*; α(L)=0.00020 *3*; α(M)=4.2×10^{-5} *6*; α(N+..)=1.05×10^{-5} *15* α(N)=9.1×10^{-6} *13*; α(O)=1.39×10^{-6} *21*; α(P)=1.01×10^{-7} *18*
2170.74	19/2$^-$	311.4[#] *1*	6.7[#] *19*	1859.11	19/2$^-$			
		458.0[#] *1*	100[#] *4*	1712.75	17/2$^-$	D		
		641.9[#] *1*	97[#] *5*	1528.99	15/2$^-$	E2	0.00510 *8*	α=0.00510 *8*; α(K)=0.00433 *6*; α(L)=0.000612 *9*; α(M)=0.0001268 *18*; α(N+..)=3.15×10^{-5} *5* α(N)=2.72×10^{-5} *4*; α(O)=4.07×10^{-6} *6*; α(P)=2.64×10^{-7} *4*
		1201.8[#] *1*	41.0[#] *19*	968.97	15/2$^-$	E2	0.001236 *18*	α=0.001236 *18*; α(K)=0.001058 *15*; α(L)=0.0001358 *19*; α(M)=2.79×10^{-5} *4*; α(N+..)=1.351×10^{-5} α(N)=6.01×10^{-6} *9*; α(O)=9.17×10^{-7} *13*; α(P)=6.58×10^{-8} *10*; α(IPF)=6.52×10^{-6} *10*
2210.97	15/2$^+$	577.9[#] *1*	<57[#]	1633.08	13/2$^+$	(M1)	0.00921 *13*	α=0.00921 *13*; α(K)=0.00793 *12*; α(L)=0.001015 *15*; α(M)=0.000209 *3*; α(N+..)=5.24×10^{-5} *8* α(N)=4.50×10^{-5} *7*; α(O)=6.92×10^{-6} *10*; α(P)=5.12×10^{-7} *8*
		835.3[#] *1*	100[#] *17*	1375.65	11/2$^+$	E2	0.00270 *4*	α=0.00270 *4*; α(K)=0.00231 *4*; α(L)=0.000311 *5*; α(M)=6.42×10^{-5} *9*; α(N+..)=1.602×10^{-5} *23* α(N)=1.379×10^{-5} *20*; α(O)=2.09×10^{-6} *3*; α(P)=1.428×10^{-7} *20*
2366.04	23/2$^+$	423.9[#] *1*	100[#]	1942.07	19/2$^+$	E2	0.01573	α(K)=0.01311 *19*; α(L)=0.00208 *3*; α(M)=0.000434 *6*; α(N+..)=0.0001069 *15* α(N)=9.25×10^{-5} *13*; α(O)=1.359×10^{-5} *19*; α(P)=7.77×10^{-7} *11*
2381.97	21/2$^+$	439.9[#] *1*	100[#]	1942.07	19/2$^+$	M1+E2	0.0161 *21*	α(K)=0.0137 *19*; α(L)=0.00193 *9*; α(M)=0.000400 *16*; α(N+..)=0.000100 *5* α(N)=8.6×10^{-5} *4*; α(O)=1.29×10^{-5} *9*; α(P)=8.6×10^{-7} *16*
2447.22	17/2$^+$	814.1[#] *1*	100[#]	1633.08	13/2$^+$	E2	0.00287 *4*	α=0.00287 *4*; α(K)=0.00245 *4*; α(L)=0.000331 *5*; α(M)=6.84×10^{-5} *10*; α(N+..)=1.706×10^{-5} *24* α(N)=1.469×10^{-5} *21*; α(O)=2.22×10^{-6} *4*; α(P)=1.513×10^{-7} *22*
2495.99	(21/2$^+$)	554.0[#] *1*	100[#]	1942.07	19/2$^+$	(M1+E2)	0.0088 *14*	α=0.0088 *14*; α(K)=0.0075 *13*; α(L)=0.00103 *11*; α(M)=0.000212 *21*; α(N+..)=5.3×10^{-5} *6* α(N)=4.6×10^{-5} *5*; α(O)=6.9×10^{-6} *8*; α(P)=4.8×10^{-7} *10*
2509.26	21/2$^-$	338.6[#] *1*	100[#] *4*	2170.74	19/2$^-$	(M1)	0.0354	α(K)=0.0304 *5*; α(L)=0.00396 *6*; α(M)=0.000815 *12*; α(N+..)=0.000205 *3* α(N)=0.0001760 *25*; α(O)=2.70×10^{-5} *4*; α(P)=1.98×10^{-6} *3*
		650.2[#] *1*	26.4[#] *12*	1859.11	19/2$^-$	M1+E2	0.0059 *10*	α=0.0059 *10*; α(K)=0.0051 *9*; α(L)=0.00068 *9*; α(M)=0.000139 *17*; α(N+..)=3.5×10^{-5} *5* α(N)=3.0×10^{-5} *4*; α(O)=4.6×10^{-6} *7*; α(P)=3.2×10^{-7} *7*
		796.5[#] *1*	9.0[#] *6*	1712.75	17/2$^-$	E2	0.00302 *5*	α=0.00302 *5*; α(K)=0.00258 *4*; α(L)=0.000350 *5*; α(M)=7.22×10^{-5} *11*; α(N+..)=1.80×10^{-5} *3* α(N)=1.551×10^{-5} *22*; α(O)=2.34×10^{-6} *4*; α(P)=1.590×10^{-7} *23*

$^{133}_{56}Ba_{77}$-13

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
2526.47	19/2$^-$	490.0[#] *5*	60[#] *20*	2036.19	17/2$^-$			
		813.8[#] *1*	100[#] *20*	1712.75	17/2$^-$	M1+E2	0.0035 *6*	α=0.0035 *6*; α(K)=0.0030 *6*; α(L)=0.00039 *6*; α(M)=7.9×10^{-5} *11*; α(N+..)=2.0×10^{-5} *3* α(N)=1.71×10^{-5} *25*; α(O)=2.6×10^{-6} *4*; α(P)=1.9×10^{-7} *4*
		997.4[#] *1*	40[#] *20*	1528.99	15/2$^-$	E2	0.00182 *3*	α=0.00182 *3*; α(K)=0.001563 *22*; α(L)=0.000205 *3*; α(M)=4.22×10^{-5} *6*; α(N+..)=1.055×10^{-5} *15* α(N)=9.07×10^{-6} *13*; α(O)=1.379×10^{-6} *20*; α(P)=9.69×10^{-8} *14*
2671.17	21/2$^-$	812.0[#] *5*	100[#] *19*	1859.11	19/2$^-$	(M1+E2)	0.0035 *6*	α=0.0035 *6*; α(K)=0.0030 *6*; α(L)=0.00039 *6*; α(M)=8.0×10^{-5} *12*; α(N+..)=2.0×10^{-5} *3* α(N)=1.72×10^{-5} *25*; α(O)=2.6×10^{-6} *4*; α(P)=1.9×10^{-7} *4*
		958.3[#] *1*	100[#] *6*	1712.75	17/2$^-$	E2	0.00199 *3*	α=0.00199 *3*; α(K)=0.001704 *24*; α(L)=0.000225 *4*; α(M)=4.62×10^{-5} *7*; α(N+..)=1.156×10^{-5} *17* α(N)=9.95×10^{-6} *14*; α(O)=1.511×10^{-6} *22*; α(P)=1.056×10^{-7} *15*
2830.44	23/2$^-$	321.3[#] *1*	76[#] *3*	2509.26	21/2$^-$	(M1)	0.0405	α(K)=0.0348 *5*; α(L)=0.00455 *7*; α(M)=0.000936 *14*; α(N+..)=0.000235 *4* α(N)=0.000202 *3*; α(O)=3.10×10^{-5} *5*; α(P)=2.27×10^{-6} *4*
		659.6[#] *1*	<6.8[#]	2170.74	19/2$^-$	E2	0.00476 *7*	α=0.00476 *7*; α(K)=0.00404 *6*; α(L)=0.000569 *8*; α(M)=0.0001178 *17*; α(N+..)=2.93×10^{-5} *5* α(N)=2.53×10^{-5} *4*; α(O)=3.79×10^{-6} *6*; α(P)=2.48×10^{-7} *4*
		971.5[#] *1*	100[#] *3*	1859.11	19/2$^-$			
2831.10	19/2$^{(+)}$	1118.4[#] *1*	100[#]	1712.75	17/2$^-$	D		
2862.15	21/2$^+$	496.0[#] *5*	<80[#]	2366.04	23/2$^+$			
		920.1[#] *1*	100[#] *20*	1942.07	19/2$^+$	(M1+E2)	0.0026 *5*	α=0.0026 *5*; α(K)=0.0022 *4*; α(L)=0.00029 *5*; α(M)=5.9×10^{-5} *9*; α(N+..)=1.49×10^{-5} *22* α(N)=1.28×10^{-5} *19*; α(O)=2.0×10^{-6} *3*; α(P)=1.4×10^{-7} *3*
2890.38	23/2$^-$	219.2[#] *1*	2.7[#] *5*	2671.17	21/2$^-$	M1+E2	0.119 *8*	α(K)=0.0975 *23*; α(L)=0.017 *5*; α(M)=0.0036 *10*; α(N+..)=0.00088 *23* α(N)=0.00076 *20*; α(O)=0.000110 *25*; α(P)=5.8×10^{-6} *5*
		381.0[#] *5*	18.2[#] *23*	2509.26	21/2$^-$			
		1031.1[#] *1*	100[#] *7*	1859.11	19/2$^-$	E2	0.001695 *24*	α=0.001695 *24*; α(K)=0.001456 *21*; α(L)=0.000190 *3*; α(M)=3.91×10^{-5} *6*; α(N+..)=9.78×10^{-6} *14* α(N)=8.41×10^{-6} *12*; α(O)=1.280×10^{-6} *18*; α(P)=9.03×10^{-8} *13*
2966.3	21/2$^-$	440.0[#] *5*	<66.7[#]	2526.47	19/2$^-$			
		930.0[#] *5*	100[#]	2036.19	17/2$^-$	E2	0.00212 *3*	α=0.00212 *3*; α(K)=0.00182 *3*; α(L)=0.000241 *4*; α(M)=4.96×10^{-5} *7*; α(N+..)=1.240×10^{-5} *18* α(N)=1.067×10^{-5} *15*; α(O)=1.619×10^{-6} *23*; α(P)=1.127×10^{-7} *16*
3062.94	21/2$^{(+)}$	231.9[#] *1*	18.8[#] *25*	2831.10	19/2$^{(+)}$	D		
		1203.9[#] *1*	100[#] *6*	1859.11	19/2$^-$	D		

$^{133}_{56}Ba_{77}$-14

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
3103.80	25/2$^+$	737.8[#] *1*	100[#]	2366.04	23/2$^+$	M1+E2	0.0044 *8*	α=0.0044 *8*; α(K)=0.0037 *7*; α(L)=0.00049 *7*; α(M)=0.000101 *14*; α(N+..)=2.5×10^{-5} *4* α(N)=2.2×10^{-5} *3*; α(O)=3.3×10^{-6} *5*; α(P)=2.4×10^{-7} *5*
3115.16	21/2$^+$	137.0[#] *5*	9.6[#] *17*	2978.2	19/2	(M1)	0.406 *7*	α(K)=0.347 *6*; α(L)=0.0464 *8*; α(M)=0.00957 *17*; α(N+..)=0.00240 *5* α(N)=0.00207 *4*; α(O)=0.000316 *6*; α(P)=2.29×10^{-5} *4*
		252.9[#] *1*	17.1[#] *25*	2862.15	21/2$^+$	(M1)	0.0761	α(K)=0.0653 *10*; α(L)=0.00859 *12*; α(M)=0.001769 *25*; α(N+..)=0.000445 *7* α(N)=0.000382 *6*; α(O)=5.85×10^{-5} *9*; α(P)=4.27×10^{-6} *6*
		667.9[#] *1*	37[#] *4*	2447.22	17/2$^+$	E2	0.00461 *7*	α=0.00461 *7*; α(K)=0.00392 *6*; α(L)=0.000550 *8*; α(M)=0.0001139 *16*; α(N+..)=2.83×10^{-5} *4* α(N)=2.44×10^{-5} *4*; α(O)=3.67×10^{-6} *6*; α(P)=2.40×10^{-7} *4*
		944.4[#] *1*	37[#] *4*	2170.74	19/2$^-$	(E1)	0.000849 *12*	α=0.000849 *12*; α(K)=0.000736 *11*; α(L)=9.04×10^{-5} *13*; α(M)=1.85×10^{-5} *3*; α(N+..)=4.64×10^{-6} *7* α(N)=3.98×10^{-6} *6*; α(O)=6.10×10^{-7} *9*; α(P)=4.48×10^{-8} *7*
		1173.3[#] *1*	100[#] *4*	1942.07	19/2$^+$	D		
3246.51	23/2$^+$	131.4[#] *1*	100[#] *7*	3115.16	21/2$^+$	(M1)	0.456	α(K)=0.390 *6*; α(L)=0.0522 *8*; α(M)=0.01077 *16*; α(N+..)=0.00270 *4* α(N)=0.00232 *4*; α(O)=0.000355 *5*; α(P)=2.57×10^{-5} *4*
		384.5[#] *1*	<10[#]	2862.15	21/2$^+$	(M1)	0.0255	α(K)=0.0219 *3*; α(L)=0.00285 *4*; α(M)=0.000586 *9*; α(N+..)=0.0001473 *21* α(N)=0.0001264 *18*; α(O)=1.94×10^{-5} *3*; α(P)=1.427×10^{-6} *20*
		416.0[#] *5*	<6.7[#]	2830.44	23/2$^-$			
		737.3[#] *1*	60[#] *3*	2509.26	21/2$^-$	(E1)	0.001391 *20*	α=0.001391 *20*; α(K)=0.001204 *17*; α(L)=0.0001492 *21*; α(M)=3.05×10^{-5} *5*; α(N+..)=7.65×10^{-6} α(N)=6.57×10^{-6} *10*; α(O)=1.004×10^{-6} *14*; α(P)=7.30×10^{-8} *11*
		750.6[#] *1*	27[#] *7*	2495.99	(21/2$^+$)			
		880.4[#] *1*	53[#] *7*	2366.04	23/2$^+$	(M1)	0.00336 *5*	α=0.00336 *5*; α(K)=0.00290 *4*; α(L)=0.000366 *6*; α(M)=7.50×10^{-5} *11*; α(N+..)=1.89×10^{-5} *3* α(N)=1.620×10^{-5} *23*; α(O)=2.49×10^{-6} *4*; α(P)=1.86×10^{-7} *3*
		1304.2[#] *1*	30[#] *7*	1942.07	19/2$^+$	E2	0.001064 *15*	α=0.001064 *15*; α(K)=0.000897 *13*; α(L)=0.0001143 *16*; α(M)=2.34×10^{-5} *4*; α(N+..)=2.84×10^{-5} α(N)=5.05×10^{-6} *7*; α(O)=7.72×10^{-7} *11*; α(P)=5.58×10^{-8} *8*; α(IPF)=2.25×10^{-5} *4*
3255.92	25/2$^-$	365.5[#] *1*	42.7[#] *24*	2890.38	23/2$^-$	(M1)	0.0291	α(K)=0.0250 *4*; α(L)=0.00325 *5*; α(M)=0.000668 *10*; α(N+..)=0.0001679 *24* α(N)=0.0001442 *21*; α(O)=2.21×10^{-5} *4*; α(P)=1.626×10^{-6} *23*
		425.5[#] *1*	46.8[#] *16*	2830.44	23/2$^-$	M1+E2	0.0176 *21*	α(K)=0.0150 *20*; α(L)=0.00212 *8*; α(M)=0.000440 *13*; α(N+..)=0.000110 *5* α(N)=9.4×10^{-5} *4*; α(O)=1.42×10^{-5} *8*; α(P)=9.4×10^{-7} *17*

$^{133}_{56}Ba_{77}$-15

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
3255.92	25/2$^-$	746.6[#] *1*	100[#] *3*	2509.26	21/2$^-$	E2	0.00352 *5*	α=0.00352 *5*; α(K)=0.00300 *5*; α(L)=0.000412 *6*; α(M)=8.51×10^{-5} *12*; α(N+..)=2.12×10^{-5} *3* α(N)=1.83×10^{-5} *3*; α(O)=2.75×10^{-6} *4*; α(P)=1.85×10^{-7} *3*
3345.94	27/2$^+$	980.0[#] *1*	100[#]	2366.04	23/2$^+$	E2	0.00189 *3*	α=0.00189 *3*; α(K)=0.001623 *23*; α(L)=0.000213 *3*; α(M)=4.39×10^{-5} *7*; α(N+..)=1.098×10^{-5} *16* α(N)=9.45×10^{-6} *14*; α(O)=1.435×10^{-6} *20*; α(P)=1.006×10^{-7} *14*
3373.60	23/2$^{(+)}$	310.8[#] *1*	100[#] *16*	3062.94	21/2$^{(+)}$			
		702.3[#] *1*	26[#] *5*	2671.17	21/2$^-$	(E1)	0.001540 *22*	α=0.001540 *22*; α(K)=0.001332 *19*; α(L)=0.0001654 *24*; α(M)=3.38×10^{-5} *5*; α(N+..)=8.47×10^{-6} α(N)=7.28×10^{-6} *11*; α(O)=1.112×10^{-6} *16*; α(P)=8.06×10^{-8} *12*
3433.71	25/2$^+$	187.2[#] *1*	100[#] *4*	3246.51	23/2$^+$	(M1)	0.1712	α(K)=0.1467 *21*; α(L)=0.0195 *3*; α(M)=0.00401 *6*; α(N+..)=0.001008 *15* α(N)=0.000866 *13*; α(O)=0.0001325 *19*; α(P)=9.64×10^{-6} *14*
		1067.6[#] *1*	16[#] *13*	2366.04	23/2$^+$	(M1)	0.00215 *3*	α=0.00215 *3*; α(K)=0.00185 *3*; α(L)=0.000233 *4*; α(M)=4.77×10^{-5} *7*; α(N+..)=1.201×10^{-5} *17* α(N)=1.031×10^{-5} *15*; α(O)=1.586×10^{-6} *23*; α(P)=1.187×10^{-7} *17*
3545.92	27/2$^-$	290.0[#] *1*	100[#] *3*	3255.92	25/2$^-$	(M1)	0.0530	α(K)=0.0455 *7*; α(L)=0.00596 *9*; α(M)=0.001227 *18*; α(N+..)=0.000308 *5* α(N)=0.000265 *4*; α(O)=4.06×10^{-5} *6*; α(P)=2.97×10^{-6} *5*
		655.4[#] *1*	9[#] *3*	2890.38	23/2$^-$			
		715.6[#] *1*	100[#] *4*	2830.44	23/2$^-$	E2	0.00389 *6*	α=0.00389 *6*; α(K)=0.00332 *5*; α(L)=0.000459 *7*; α(M)=9.49×10^{-5} *14*; α(N+..)=2.36×10^{-5} *4* α(N)=2.04×10^{-5} *3*; α(O)=3.07×10^{-6} *5*; α(P)=2.04×10^{-7} *3*
3582.69	27/2$^-$	326.8[#] *1*	82[#] *4*	3255.92	25/2$^-$	(M1)	0.0388	α(K)=0.0333 *5*; α(L)=0.00435 *6*; α(M)=0.000895 *13*; α(N+..)=0.000225 *4* α(N)=0.000193 *3*; α(O)=2.96×10^{-5} *5*; α(P)=2.17×10^{-6} *3*
		693.0[#] *5*	10[#] *3*	2890.38	23/2$^-$			
		752.3[#] *1*	100[#] *3*	2830.44	23/2$^-$	E2	0.00345 *5*	α=0.00345 *5*; α(K)=0.00295 *5*; α(L)=0.000404 *6*; α(M)=8.34×10^{-5} *12*; α(N+..)=2.08×10^{-5} *3* α(N)=1.79×10^{-5} *3*; α(O)=2.70×10^{-6} *4*; α(P)=1.81×10^{-7} *3*
3646.41	(25/2)$^+$	1280.3[#] *1*	100[#]	2366.04	23/2$^+$	M1+E2	0.00127 *18*	α=0.00127 *18*; α(K)=0.00108 *15*; α(L)=0.000136 *18*; α(M)=2.8×10^{-5} *4*; α(N+..)=2.48×10^{-5} *7* α(N)=6.0×10^{-6} *8*; α(O)=9.2×10^{-7} *13*; α(P)=6.8×10^{-8} *11*; α(IPF)=1.78×10^{-5} *4*
3688.41	(25/2$^-$)	798.0[#] *1*	100[#] *33*	2890.38	23/2$^-$			
		1018.0[#] *5*	<100[#]	2671.17	21/2$^-$			
3700.60	25/2$^{(+)}$	327.0[#] *1*	100[#]	3373.60	23/2$^{(+)}$	(M1)	0.0387	α(K)=0.0333 *5*; α(L)=0.00434 *6*; α(M)=0.000894 *13*; α(N+..)=0.000225 *4* α(N)=0.000193 *3*; α(O)=2.96×10^{-5} *5*; α(P)=2.17×10^{-6} *3*

$^{133}_{56}Ba_{77}$-16

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
3709.90	(25/2)	336.3[#] *1*	100[#]	3373.60	23/2$^{(+)}$	D		
3710.68	27/2$^+$	276.9[#] *1*	100[#]	3433.71	25/2$^+$	(M1)	0.0598	α(K)=0.0514 *8*; α(L)=0.00674 *10*; α(M)=0.001388 *20*; α(N+..)=0.000349 *5* α(N)=0.000300 *5*; α(O)=4.59×10^{-5} *7*; α(P)=3.36×10^{-6} *5*
3838.92	29/2$^+$	493.1[#] *1*	100[#] *11*	3345.94	27/2$^+$	(M1)	0.01362	α(K)=0.01173 *17*; α(L)=0.001509 *22*; α(M)=0.000310 *5*; α(N+..)=7.80×10^{-5} *11* α(N)=6.70×10^{-5} *10*; α(O)=1.028×10^{-5} *15*; α(P)=7.60×10^{-7} *11*
		735.0[#] *1*	44[#] *11*	3103.80	25/2$^+$			
3967.85		1601.8[#] *1*	100[#]	2366.04	23/2$^+$			
3987.98	27/2$^-$	1097.6[#] *1*	100[#]	2890.38	23/2$^-$	E2	0.001484 *21*	α=0.001484 *21*; α(K)=0.001276 *18*; α(L)=0.0001654 *24*; α(M)=3.40×10^{-5} *5*; α(N+..)=8.51×10^{-6} α(N)=7.32×10^{-6} *11*; α(O)=1.115×10^{-6} *16*; α(P)=7.92×10^{-8} *11*
4084.6	27/2$^{(+)}$	384.0[#] *5*	100[#] *20*	3700.60	25/2$^{(+)}$	(M1)	0.0256	α(K)=0.0220 *4*; α(L)=0.00286 *5*; α(M)=0.000588 *9*; α(N+..)=0.0001478 *22* α(N)=0.0001269 *19*; α(O)=1.95×10^{-5} *3*; α(P)=1.432×10^{-6} *21*
		711.0[#] *5*	<57[#]	3373.60	23/2$^{(+)}$			
4145.58	29/2$^+$	799.6[#] *1*	56[#] *22*	3345.94	27/2$^+$			
		1041.8[#] *1*	100[#] *11*	3103.80	25/2$^+$	E2	0.001658 *24*	α=0.001658 *24*; α(K)=0.001424 *20*; α(L)=0.000186 *3*; α(M)=3.82×10^{-5} *6*; α(N+..)=9.56×10^{-6} *14* α(N)=8.22×10^{-6} *12*; α(O)=1.251×10^{-6} *18*; α(P)=8.84×10^{-8} *13*
4179.06	29/2$^+$	468.4[#] *1*	100[#]	3710.68	27/2$^+$	(M1)	0.01549	α(K)=0.01333 *19*; α(L)=0.001718 *24*; α(M)=0.000353 *5*; α(N+..)=8.88×10^{-5} *13* α(N)=7.63×10^{-5} *11*; α(O)=1.171×10^{-5} *17*; α(P)=8.64×10^{-7} *13*
4194.42	29/2$^-$	938.4[#] *1*	100[#]	3255.92	25/2$^-$	E2	0.00208 *3*	α=0.00208 *3*; α(K)=0.001784 *25*; α(L)=0.000236 *4*; α(M)=4.86×10^{-5} *7*; α(N+..)=1.214×10^{-5} *17* α(N)=1.044×10^{-5} *15*; α(O)=1.585×10^{-6} *23*; α(P)=1.105×10^{-7} *16*
4203.20	31/2$^+$	857.2[#] *1*	100[#]	3345.94	27/2$^+$	E2	0.00255 *4*	α=0.00255 *4*; α(K)=0.00218 *3*; α(L)=0.000292 *4*; α(M)=6.03×10^{-5} *9*; α(N+..)=1.505×10^{-5} *21* α(N)=1.295×10^{-5} *19*; α(O)=1.96×10^{-6} *3*; α(P)=1.348×10^{-7} *19*
4223.82	(29/2$^+$)	513.1[#] *1*	100[#] *10*	3710.68	27/2$^+$	(M1)	0.01234	α(K)=0.01063 *15*; α(L)=0.001366 *20*; α(M)=0.000281 *4*; α(N+..)=7.06×10^{-5} *10* α(N)=6.06×10^{-5} *9*; α(O)=9.30×10^{-6} *13*; α(P)=6.88×10^{-7} *10*
		877.8[#] *1*	90[#] *20*	3345.94	27/2$^+$			
4242.86	31/2$^-$	660.1[#] *1*	100[#] *7*	3582.69	27/2$^-$	E2	0.00475 *7*	α=0.00475 *7*; α(K)=0.00404 *6*; α(L)=0.000568 *8*; α(M)=0.0001176 *17*; α(N+..)=2.92×10^{-5} *4* α(N)=2.52×10^{-5} *4*; α(O)=3.78×10^{-6} *6*; α(P)=2.47×10^{-7} *4*
		697.0[#] *1*	71[#] *6*	3545.92	27/2$^-$	E2	0.00415 *6*	α=0.00415 *6*; α(K)=0.00353 *5*; α(L)=0.000492 *7*; α(M)=0.0001017 *15*;

$^{133}_{56}Ba_{77}$-17

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
								α(N+..)=2.53×10^{-5} *4* α(N)=2.18×10^{-5} *3*; α(O)=3.28×10^{-6} *5*; α(P)=2.17×10^{-7} *3*
4255.82	29/2$^+$	545.1[#] *1*	100[#]	3710.68	27/2$^+$	(M1)	0.01063	α(K)=0.00915 *13*; α(L)=0.001174 *17*; α(M)=0.000241 *4*; α(N+..)=6.07×10^{-5} *9* α(N)=5.21×10^{-5} *8*; α(O)=8.00×10^{-6} *12*; α(P)=5.92×10^{-7} *9*
		1152.1[#] *1*	21[#] *5*	3103.80	25/2$^+$			
4402.41	(27/2)	756.0[#] *5*	<100[#]	3646.41	(25/2)$^+$			
4421.91	31/2$^-$	227.4[#] *1*	24.3[#] *15*	4194.42	29/2$^-$	(M1)	0.1011	α(K)=0.0867 *13*; α(L)=0.01144 *16*; α(M)=0.00236 *4*; α(N+..)=0.000592 *9* α(N)=0.000509 *8*; α(O)=7.79×10^{-5} *11*; α(P)=5.68×10^{-6} *8*
		839.4[#] *1*	100[#] *4*	3582.69	27/2$^-$	E2	0.00267 *4*	α=0.00267 *4*; α(K)=0.00229 *4*; α(L)=0.000308 *5*; α(M)=6.34×10^{-5} *9*; α(N+..)=1.583×10^{-5} *23* α(N)=1.363×10^{-5} *19*; α(O)=2.06×10^{-6} *3*; α(P)=1.413×10^{-7} *20*
		875.9[#] *1*	56[#] *4*	3545.92	27/2$^-$	E2	0.00243 *4*	α=0.00243 *4*; α(K)=0.00208 *3*; α(L)=0.000278 *4*; α(M)=5.72×10^{-5} *8*; α(N+..)=1.429×10^{-5} *20* α(N)=1.229×10^{-5} *18*; α(O)=1.86×10^{-6} *3*; α(P)=1.285×10^{-7} *18*
4425.08	(27/2$^+$)	778.6[#] *1*	83[#] *17*	3646.41	(25/2)$^+$	D		
		1321.3[#] *1*	100[#] *17*	3103.80	25/2$^+$	D		
4485.34	31/2$^+$	261.4[#] *1*	57[#] *7*	4223.82	(29/2$^+$)	(M1)	0.0697	α(K)=0.0598 *9*; α(L)=0.00786 *11*; α(M)=0.001619 *23*; α(N+..)=0.000407 *6* α(N)=0.000349 *5*; α(O)=5.35×10^{-5} *8*; α(P)=3.91×10^{-6} *6*
		282.2[#] *1*	64[#] *7*	4203.20	31/2$^+$	(M1)	0.0569	α(K)=0.0489 *7*; α(L)=0.00641 *9*; α(M)=0.001319 *19*; α(N+..)=0.000332 *5* α(N)=0.000285 *4*; α(O)=4.36×10^{-5} *7*; α(P)=3.19×10^{-6} *5*
		774.7[#] *1*	36[#] *7*	3710.68	27/2$^+$	E2	0.00322 *5*	α=0.00322 *5*; α(K)=0.00275 *4*; α(L)=0.000375 *6*; α(M)=7.74×10^{-5} *11*; α(N+..)=1.93×10^{-5} *3* α(N)=1.662×10^{-5} *24*; α(O)=2.51×10^{-6} *4*; α(P)=1.695×10^{-7} *24*
		1139.3[#] *1*	100[#] *7*	3345.94	27/2$^+$	E2	0.001374 *20*	α=0.001374 *20*; α(K)=0.001181 *17*; α(L)=0.0001524 *22*; α(M)=3.13×10^{-5} *5*; α(N+..)=9.32×10^{-6} α(N)=6.74×10^{-6} *10*; α(O)=1.028×10^{-6} *15*; α(P)=7.34×10^{-8} *11*; α(IPF)=1.482×10^{-6} *22*
4500.6	29/2$^{(+)}$	416.0[#] *5*	100[#]	4084.6	27/2$^{(+)}$			
4502.44	31/2$^+$	246.6[#] *1*	71[#] *4*	4255.82	29/2$^+$	D		
		323.5[#] *1*	64[#] *7*	4179.06	29/2$^+$	(M1)	0.0398	α(K)=0.0342 *5*; α(L)=0.00447 *7*; α(M)=0.000919 *13*; α(N+..)=0.000231 *4* α(N)=0.000198 *3*; α(O)=3.04×10^{-5} *5*; α(P)=2.23×10^{-6} *4*
		791.7[#] *1*	100[#] *7*	3710.68	27/2$^+$	E2	0.00306 *5*	α=0.00306 *5*; α(K)=0.00261 *4*; α(L)=0.000355 *5*; α(M)=7.33×10^{-5} *11*; α(N+..)=1.83×10^{-5} *3* α(N)=1.574×10^{-5} *22*; α(O)=2.38×10^{-6} *4*; α(P)=1.613×10^{-7} *23*

$^{133}_{56}Ba_{77}$-18

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
4502.44	31/2$^+$	1156.7[#] *1*	64[#] *7*	3345.94	27/2$^+$			
4633.61	(29/2)	1051.0[#] *5*	100[#]	3582.69	27/2$^-$			
4657.81	29/2$^-$	232.7[#] *1*	15[#] *3*	4425.08	(27/2$^+$)			
		255.4[#] *1*	17.8[#] *10*	4402.41	(27/2)	D		
		690.6[#a] *1*	8[#] *3*	3967.85				
		1075.1[#] *1*	100[#] *5*	3582.69	27/2$^-$	M1+E2	0.0018 *3*	α=0.0018 *3*; α(K)=0.00158 *25*; α(L)=0.00020 *3*; α(M)=4.1×10^{-5} *6*; α(N+..)=1.04×10^{-5} *15* α(N)=8.9×10^{-6} *13*; α(O)=1.36×10^{-6} *20*; α(P)=1.00×10^{-7} *17*
		1311.9[#] *1*	10.0[#] *17*	3345.94	27/2$^+$	D		
4824.51	31/2$^-$	166.7[#] *1*	100.0[#] *9*	4657.81	29/2$^-$	D		
		190.9[#] *1*	6.5[#] *11*	4633.61	(29/2)	D		
4830.57	33/2$^+$	345.3[#] *1*	14[#] *6*	4485.34	31/2$^+$	D		
		627.3[&#] *1*	100[&#] *6*	4203.20	31/2$^+$	(M1)	0.00754 *11*	α=0.00754 *11*; α(K)=0.00649 *9*; α(L)=0.000829 *12*; α(M)=0.0001702 *24*; α(N+..)=4.28×10^{-5} *6* α(N)=3.68×10^{-5} *6*; α(O)=5.65×10^{-6} *8*; α(P)=4.19×10^{-7} *6*
5001.45	33/2$^+$	499.1[#] *1*	100[#] *9*	4502.44	31/2$^+$	(M1)	0.01322	α(K)=0.01138 *16*; α(L)=0.001464 *21*; α(M)=0.000301 *5*; α(N+..)=7.57×10^{-5} *11* α(N)=6.50×10^{-5} *9*; α(O)=9.97×10^{-6} *14*; α(P)=7.37×10^{-7} *11*
		822.3[#] *1*	18[#] *5*	4179.06	29/2$^+$	E2	0.00280 *4*	α=0.00280 *4*; α(K)=0.00240 *4*; α(L)=0.000323 *5*; α(M)=6.67×10^{-5} *10*; α(N+..)=1.665×10^{-5} *24* α(N)=1.433×10^{-5} *20*; α(O)=2.17×10^{-6} *3*; α(P)=1.480×10^{-7} *21*
5058.11	33/2$^-$	233.6[#] *1*	100[#]	4824.51	31/2$^-$	(M1)	0.0940	α(K)=0.0807 *12*; α(L)=0.01064 *15*; α(M)=0.00219 *3*; α(N+..)=0.000551 *8* α(N)=0.000473 *7*; α(O)=7.24×10^{-5} *11*; α(P)=5.29×10^{-6} *8*
5174.16	33/2$^+$	918.4[#] *1*	100[#] *13*	4255.82	29/2$^+$	E2	0.00218 *3*	α=0.00218 *3*; α(K)=0.00187 *3*; α(L)=0.000248 *4*; α(M)=5.11×10^{-5} *8*; α(N+..)=1.277×10^{-5} *18* α(N)=1.099×10^{-5} *16*; α(O)=1.667×10^{-6} *24*; α(P)=1.158×10^{-7} *17*
		995.0[#] *5*	25[#] *13*	4179.06	29/2$^+$			
5242.24	35/2$^+$	411.6[#] *1*	11.7[#] *17*	4830.57	33/2$^+$	(M1)		
		1039.0[#] *1*	100[#] *5*	4203.20	31/2$^+$	E2	0.001667 *24*	α=0.001667 *24*; α(K)=0.001432 *20*; α(L)=0.000187 *3*; α(M)=3.84×10^{-5} *6*; α(N+..)=9.62×10^{-6} *14* α(N)=8.27×10^{-6} *12*; α(O)=1.258×10^{-6} *18*; α(P)=8.89×10^{-8} *13*
5263.4	(33/2$^-$)	1069.0[#] *5*	100[#]	4194.42	29/2$^-$			
5350.41	35/2$^-$	292.3[#] *1*	100[#]	5058.11	33/2$^-$	(M1)	0.0519	α(K)=0.0446 *7*; α(L)=0.00584 *9*; α(M)=0.001202 *17*; α(N+..)=0.000302 *5* α(N)=0.000259 *4*; α(O)=3.98×10^{-5} *6*; α(P)=2.91×10^{-6} *4*
5391.72	35/2$^-$	969.8[#] *1*	100[#] *7*	4421.91	31/2$^-$	E2	0.00194 *3*	α=0.00194 *3*; α(K)=0.001660 *24*; α(L)=0.000219 *3*; α(M)=4.50×10^{-5}

$^{133}_{56}Ba_{77}$-19

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
								7; α(N+..)=1.125×10^{-5} *16* α(N)=9.68×10^{-6} *14*; α(O)=1.470×10^{-6} *21*; α(P)=1.029×10^{-7} *15*
5391.72	35/2$^-$	1148.9[#] *1*	16.7[#] *19*	4242.86	31/2$^-$	E2	0.001351 *19*	α=0.001351 *19*; α(K)=0.001161 *17*; α(L)=0.0001497 *21*; α(M)=3.07×10^{-5} *5*; α(N+..)=9.65×10^{-6} α(N)=6.62×10^{-6} *10*; α(O)=1.009×10^{-6} *15*; α(P)=7.21×10^{-8} *10*; α(IPF)=1.95×10^{-6} *3*
5417.80	35/2$^+$	243.7[#] *1*	22[#] *2*	5174.16	33/2$^+$	D		
		415.9[#a] *1*	25[#] *5*	5001.45	33/2$^+$	(M1)	0.0209	α(K)=0.0180 *3*; α(L)=0.00233 *4*; α(M)=0.000478 *7*; α(N+..)=0.0001203 *17* α(N)=0.0001033 *15*; α(O)=1.585×10^{-5} *23*; α(P)=1.168×10^{-6} *17* E_γ: poor fit.
		586.0[#] *5*	15[#] *5*	4830.57	33/2$^+$			E_γ: poor fit.
		915.5[#] *1*	100[#] *5*	4502.44	31/2$^+$	E2	0.00220 *3*	α=0.00220 *3*; α(K)=0.00188 *3*; α(L)=0.000250 *4*; α(M)=5.15×10^{-5} *8*; α(N+..)=1.286×10^{-5} *18* α(N)=1.107×10^{-5} *16*; α(O)=1.679×10^{-6} *24*; α(P)=1.166×10^{-7} *17*
		932.3[#] *1*	40[#] *5*	4485.34	31/2$^+$	E2	0.00211 *3*	α=0.00211 *3*; α(K)=0.00181 *3*; α(L)=0.000240 *4*; α(M)=4.93×10^{-5} *7*; α(N+..)=1.233×10^{-5} *18* α(N)=1.060×10^{-5} *15*; α(O)=1.610×10^{-6} *23*; α(P)=1.121×10^{-7} *16*
5430.11	33/2$^-$	1187.2[#] *1*	100[#]	4242.86	31/2$^-$	M1+E2	0.00148 *22*	α=0.00148 *22*; α(K)=0.00127 *19*; α(L)=0.000161 *22*; α(M)=3.3×10^{-5} *5*; α(N+..)=1.31×10^{-5} *11* α(N)=7.1×10^{-6} *10*; α(O)=1.09×10^{-6} *16*; α(P)=8.0×10^{-8} *13*; α(IPF)=4.82×10^{-6} *13*
5465.17	(35/2)$^+$	634.6[#] *1*	100[#]	4830.57	33/2$^+$	M1+E2	0.0063 *11*	α=0.0063 *11*; α(K)=0.0054 *10*; α(L)=0.00072 *9*; α(M)=0.000148 *18*; α(N+..)=3.7×10^{-5} *5* α(N)=3.2×10^{-5} *4*; α(O)=4.8×10^{-6} *7*; α(P)=3.4×10^{-7} *7*
5520.56	35/2$^-$	1278.0[#] *5*	100[#]	4242.86	31/2$^-$	E2	0.001102 *16*	α=0.001102 *16*; α(K)=0.000935 *14*; α(L)=0.0001192 *17*; α(M)=2.45×10^{-5} *4*; α(N+..)=2.38×10^{-5} α(N)=5.27×10^{-6} *8*; α(O)=8.05×10^{-7} *12*; α(P)=5.81×10^{-8} *9*; α(IPF)=1.77×10^{-5} *3*
5661.86	35/2$^-$	231.7[#] *1*	29[#] *10*	5430.11	33/2$^-$			
		1419.0[#] *1*	100[#] *5*	4242.86	31/2$^-$	E2	0.000932 *13*	α=0.000932 *13*; α(K)=0.000760 *11*; α(L)=9.60×10^{-5} *14*; α(M)=1.97×10^{-5} *3*; α(N+..)=5.70×10^{-5} *8* α(N)=4.24×10^{-6} *6*; α(O)=6.49×10^{-7} *9*; α(P)=4.73×10^{-8} *7*; α(IPF)=5.20×10^{-5} *8*
5735.61	37/2$^-$	385.2[#] *1*	100[#]	5350.41	35/2$^-$			
5858.16	37/2$^+$	615.8[#] *1*	100[#] *15*	5242.24	35/2$^+$	(M1)	0.00788 *11*	α=0.00788 *11*; α(K)=0.00679 *10*; α(L)=0.000868 *13*; α(M)=0.0001782 *25*; α(N+..)=4.48×10^{-5} α(N)=3.85×10^{-5} *6*; α(O)=5.91×10^{-6} *9*; α(P)=4.39×10^{-7} *7*

$^{133}_{56}Ba_{77}$-20

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
5858.16	37/2$^+$	1027.7[#] *1*	46[#] *8*	4830.57	33/2$^+$	E2	0.001707 *24*	α=0.001707 *24*; α(K)=0.001466 *21*; α(L)=0.000192 *3*; α(M)=3.94×10^{-5} *6*; α(N+..)=9.86×10^{-6} *14* α(N)=8.48×10^{-6} *12*; α(O)=1.289×10^{-6} *18*; α(P)=9.09×10^{-8} *13*
5936.24	37/2$^+$	518.3[#] *1*	100[#] *8*	5417.80	35/2$^+$	(M1)	0.01204	α(K)=0.01036 *15*; α(L)=0.001331 *19*; α(M)=0.000274 *4*; α(N+..)=6.88×10^{-5} *10* α(N)=5.91×10^{-5} *9*; α(O)=9.07×10^{-6} *13*; α(P)=6.71×10^{-7} *10*
		935.0[#] *5*	46[#] *8*	5001.45	33/2$^+$	[E2]	0.00210 *3*	α=0.00210 *3*; α(K)=0.00180 *3*; α(L)=0.000238 *4*; α(M)=4.90×10^{-5} *7*; α(N+..)=1.224×10^{-5} *18* α(N)=1.053×10^{-5} *15*; α(O)=1.599×10^{-6} *23*; α(P)=1.114×10^{-7} *16*
5983.71	37/2$^-$	321.8[#] *1*	100[#] *16*	5661.86	35/2$^-$			
		463.1[#] *1*	63[#] *5*	5520.56	35/2$^-$	(M1)	0.01594	α(K)=0.01371 *20*; α(L)=0.001769 *25*; α(M)=0.000364 *5*; α(N+..)=9.14×10^{-5} *13* α(N)=7.85×10^{-5} *11*; α(O)=1.205×10^{-5} *17*; α(P)=8.90×10^{-7} *13*
		592.1[#] *1*	68[#] *5*	5391.72	35/2$^-$	(M1)	0.00868 *13*	α=0.00868 *13*; α(K)=0.00747 *11*; α(L)=0.000956 *14*; α(M)=0.000196 *3*; α(N+..)=4.94×10^{-5} *7* α(N)=4.24×10^{-5} *6*; α(O)=6.51×10^{-6} *10*; α(P)=4.83×10^{-7} *7*
6237.0	39/2$^-$	501.4[#] *1*	100[#]	5735.61	37/2$^-$	(M1)	0.01307	α(K)=0.01125 *16*; α(L)=0.001447 *21*; α(M)=0.000297 *5*; α(N+..)=7.48×10^{-5} *11* α(N)=6.42×10^{-5} *9*; α(O)=9.86×10^{-6} *14*; α(P)=7.29×10^{-7} *11*
6277.35	39/2$^+$	419.2[#] *1*	30.5[#] *22*	5858.16	37/2$^+$	(M1)	0.0205	α(K)=0.01762 *25*; α(L)=0.00228 *4*; α(M)=0.000469 *7*; α(N+..)=0.0001179 *17* α(N)=0.0001012 *15*; α(O)=1.553×10^{-5} *22*; α(P)=1.145×10^{-6} *16*
		1035.1[#] *1*	100[#] *5*	5242.24	35/2$^+$	E2	0.001681 *24*	α=0.001681 *24*; α(K)=0.001444 *21*; α(L)=0.000188 *3*; α(M)=3.88×10^{-5} *6*; α(N+..)=9.70×10^{-6} *14* α(N)=8.34×10^{-6} *12*; α(O)=1.269×10^{-6} *18*; α(P)=8.96×10^{-8} *13*
6307.92	39/2$^-$	324.3[#] *1*	50[#] *8*	5983.71	37/2$^-$	(M1)	0.0396	α(K)=0.0340 *5*; α(L)=0.00444 *7*; α(M)=0.000913 *13*; α(N+..)=0.000230 *4* α(N)=0.000197 *3*; α(O)=3.02×10^{-5} *5*; α(P)=2.22×10^{-6} *4*
		916.2[#] *1*	100[#] *8*	5391.72	35/2$^-$	E2	0.00219 *3*	α=0.00219 *3*; α(K)=0.00188 *3*; α(L)=0.000250 *4*; α(M)=5.14×10^{-5} *8*; α(N+..)=1.284×10^{-5} *18* α(N)=1.105×10^{-5} *16*; α(O)=1.676×10^{-6} *24*; α(P)=1.164×10^{-7} *17*
6366.90	39/2$^-$	383.1[#] *1*	67[#] *17*	5983.71	37/2$^-$			
		846.4[#] *1*	100[#] *25*	5520.56	35/2$^-$	E2	0.00262 *4*	α=0.00262 *4*; α(K)=0.00224 *4*; α(L)=0.000301 *5*; α(M)=6.22×10^{-5} *9*; α(N+..)=1.551×10^{-5} *22* α(N)=1.335×10^{-5} *19*; α(O)=2.02×10^{-6} *3*; α(P)=1.387×10^{-7} *20*
		975.1[#] *1*	42[#] *8*	5391.72	35/2$^-$			
6425.78	39/2$^+$	489.4[#] *1*	19[#] *5*	5936.24	37/2$^+$			
		1008.1[#] *1*	100[#] *10*	5417.80	35/2$^+$	E2	0.001779 *25*	α=0.001779 *25*; α(K)=0.001528 *22*; α(L)=0.000200 *3*; α(M)=4.12×10^{-5} *6*;

$^{133}_{56}Ba_{77}$-21

Adopted Levels, Gammas (continued)

γ(^{133}Ba) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.[@]	α[†]	Comments
								α(N+..)=1.029×10^{-5} *1* α(N)=8.85×10^{-6} *13*; α(O)=1.346×10^{-6} *19*; α(P)=9.47×10^{-8} *14*
6546.16		688.0[#] *1*	100[#]	5858.16	37/2$^+$			
6749.51	41/2$^-$	382.5[#] *1*	71[#] *18*	6366.90	39/2$^-$	(M1)	0.0259	α(K)=0.0222 *4*; α(L)=0.00289 *4*; α(M)=0.000594 *9*; α(N+..)=0.0001493 *21* α(N)=0.0001282 *18*; α(O)=1.97×10^{-5} *3*; α(P)=1.446×10^{-6} *21*
		441.7[#] *1*	100[#] *12*	6307.92	39/2$^-$	(M1)	0.0180	α(K)=0.01544 *22*; α(L)=0.00199 *3*; α(M)=0.000410 *6*; α(N+..)=0.0001031 *15* α(N)=8.85×10^{-5} *13*; α(O)=1.359×10^{-5} *19*; α(P)=1.002×10^{-6} *14*
6818.0	41/2$^-$	581.0[#] *1*	100[#] *5*	6237.0	39/2$^-$	(M1)	0.00909 *13*	α=0.00909 *13*; α(K)=0.00783 *11*; α(L)=0.001002 *14*; α(M)=0.000206 *3*; α(N+..)=5.18×10^{-5} *8* α(N)=4.44×10^{-5} *7*; α(O)=6.82×10^{-6} *10*; α(P)=5.06×10^{-7} *7*
		1081.5[#a] *1*	14[#] *5*	5735.61	37/2$^-$			
6955.08	41/2$^+$	529.3[#] *1*	100[#]	6425.78	39/2$^+$			
6980.56	(41/2$^+$)	703.2[#] *1*	100[#]	6277.35	39/2$^+$			
7217.71	43/2$^-$	468.2[#] *1*	100[#]	6749.51	41/2$^-$	(M1)	0.01551	α(K)=0.01334 *19*; α(L)=0.001720 *25*; α(M)=0.000354 *5*; α(N+..)=8.89×10^{-5} *13* α(N)=7.63×10^{-5} *11*; α(O)=1.172×10^{-5} *17*; α(P)=8.65×10^{-7} *13*
7421.0	43/2$^-$	603.0[#] *5*	100[#] *10*	6818.0	41/2$^-$	(M1)	0.00830 *12*	α=0.00830 *12*; α(K)=0.00715 *11*; α(L)=0.000914 *13*; α(M)=0.000188 *3*; α(N+..)=4.72×10^{-5} *7* α(N)=4.05×10^{-5} *6*; α(O)=6.23×10^{-6} *9*; α(P)=4.62×10^{-7} *7*
		1184.0[#] *5*	30[#] *10*	6237.0	39/2$^-$			
7431.38	(43/2$^+$)	476.3[#] *1*	100[#] *33*	6955.08	41/2$^+$			
		1005.6[#] *1*	100[#] *17*	6425.78	39/2$^+$			
7585.86	43/2$^+$	1308.5[#] *1*	100[#]	6277.35	39/2$^+$			
8052.0	45/2$^-$	631.0[#] *5*	100[#] *14*	7421.0	43/2$^-$	(M1)	0.00743 *11*	α=0.00743 *11*; α(K)=0.00640 *9*; α(L)=0.000817 *12*; α(M)=0.0001678 *24*; α(N+..)=4.22×10^{-5} *6* α(N)=3.62×10^{-5} *6*; α(O)=5.57×10^{-6} *8*; α(P)=4.13×10^{-7} *6*
		1234.0[#] *5*	86[#] *14*	6818.0	41/2$^-$			

[†] Additional information 1.
[‡] From ^{133}La ε decay (3.912 h) for levels below 1830 keV, otherwise from ^{124}Sn(^{13}C,4nγ), except as noted.
[#] From ^{124}Sn(^{13}C,4nγ).
[@] From α(exp), γ(θ) and DCO ratios in ^{133}La ε decay (3.912 h) and ^{124}Sn(^{13}C,4nγ).
[&] Multiply placed with intensity suitably divided.
[a] Placement of transition in the level scheme is uncertain.

$^{133}_{56}Ba_{77}$-22

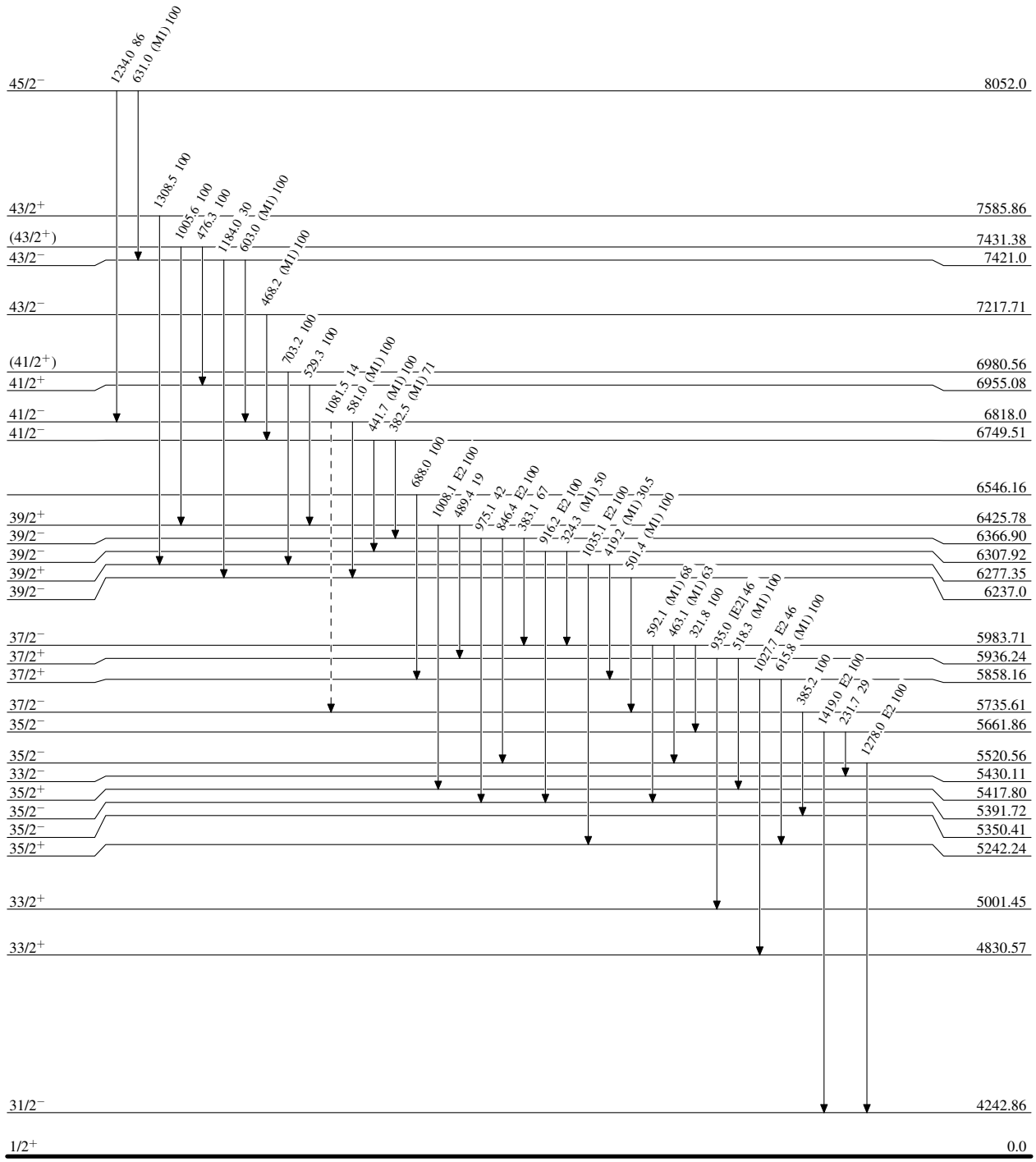
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{133}_{56}Ba_{77}$

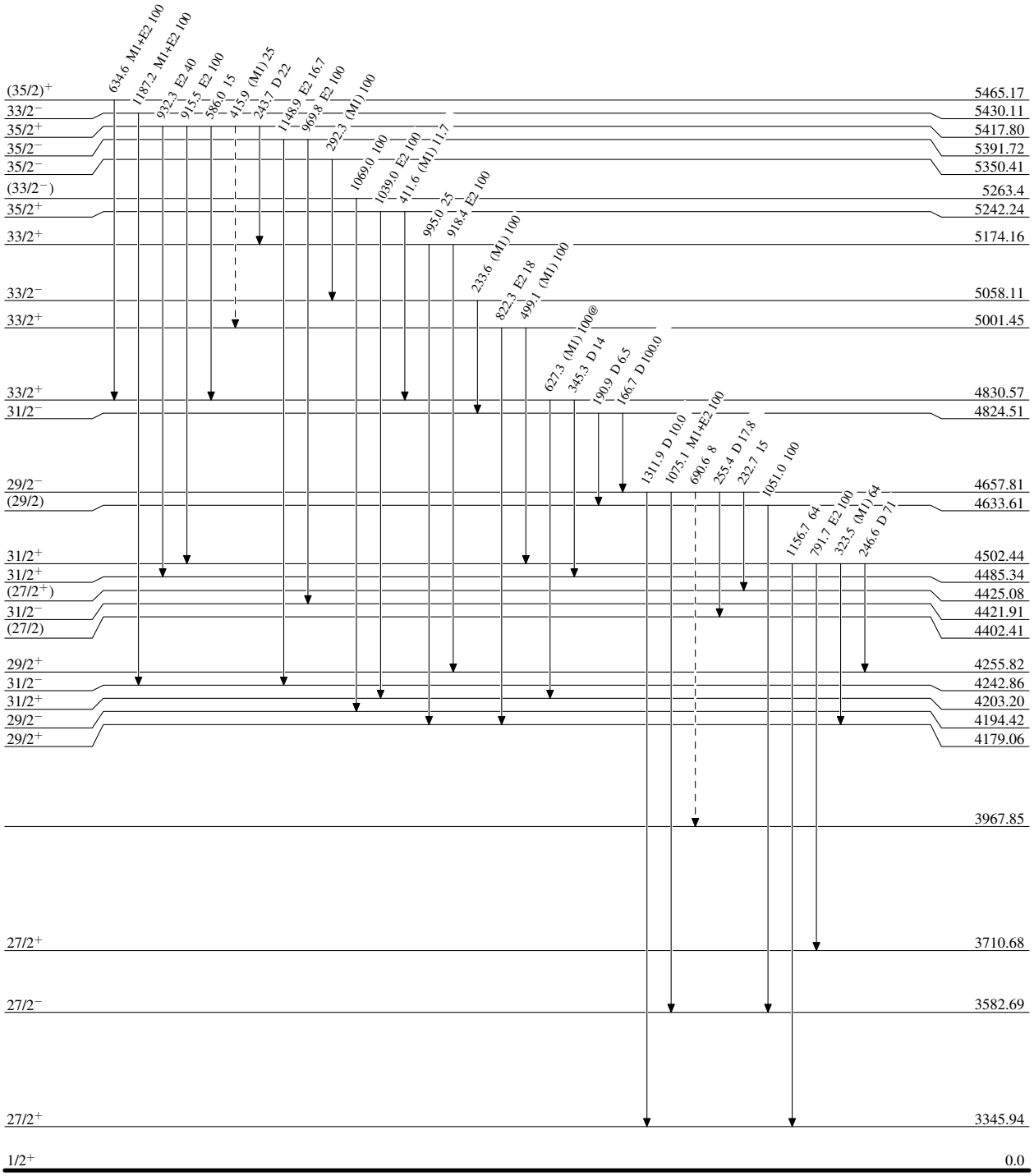
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)



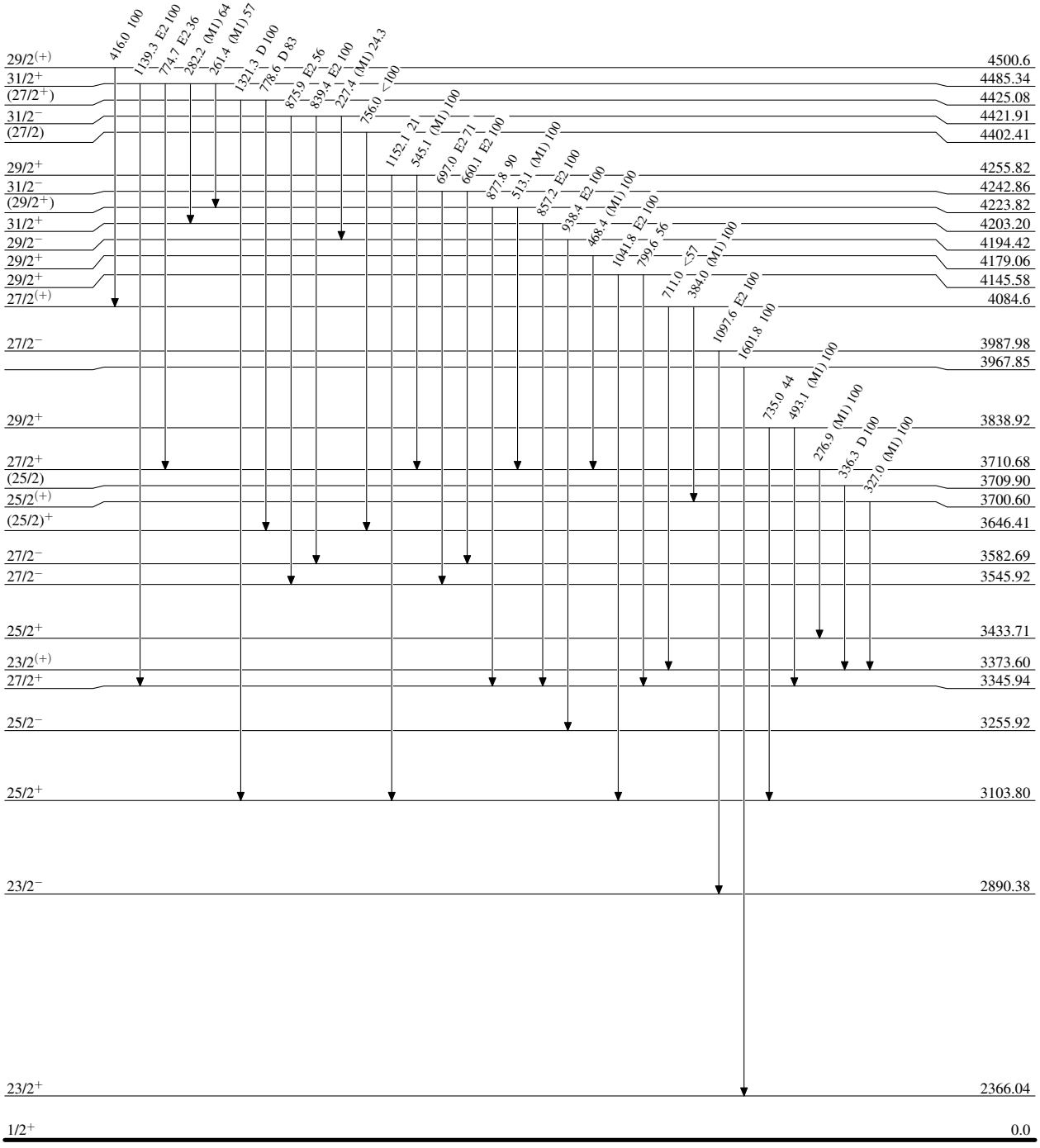
10.551 y *11*

$^{133}_{56}Ba_{77}$

Adopted Levels, Gammas

Level Scheme (continued)

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

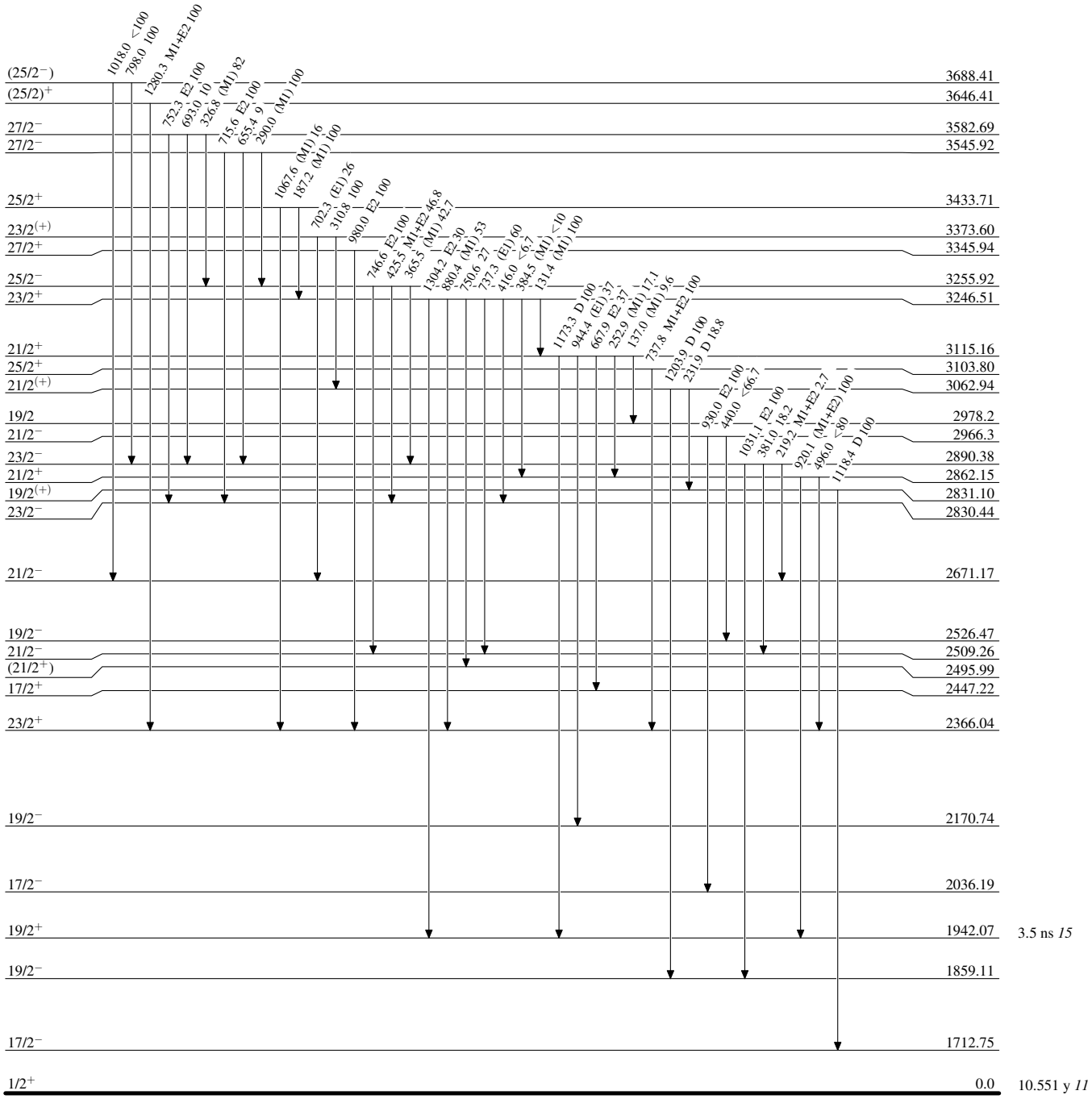


$^{133}_{56}Ba_{77}$

Adopted Levels, Gammas

Level Scheme (continued)

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



$^{133}_{56}Ba_{77}$

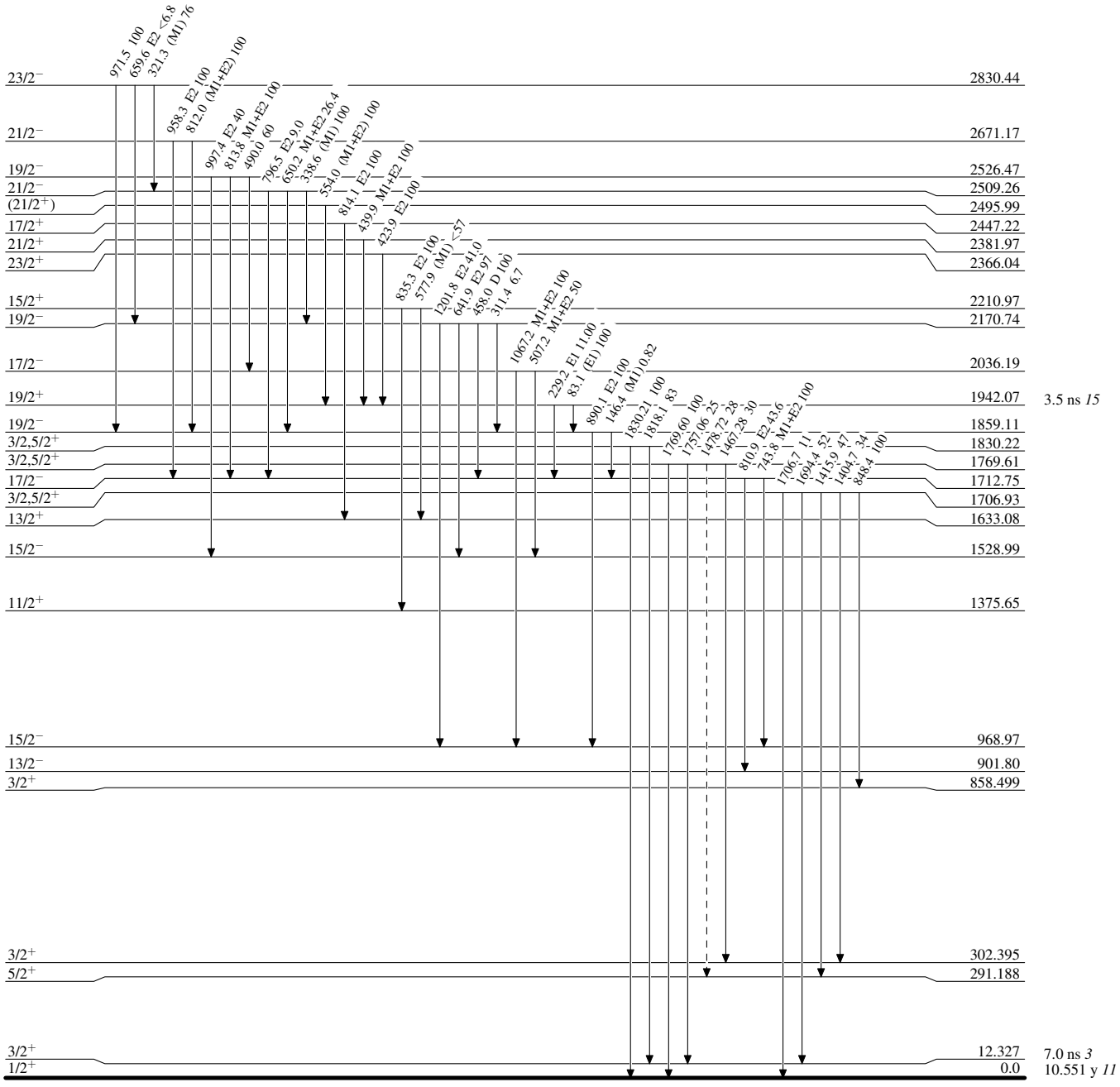
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)



$^{133}_{56}Ba_{77}$

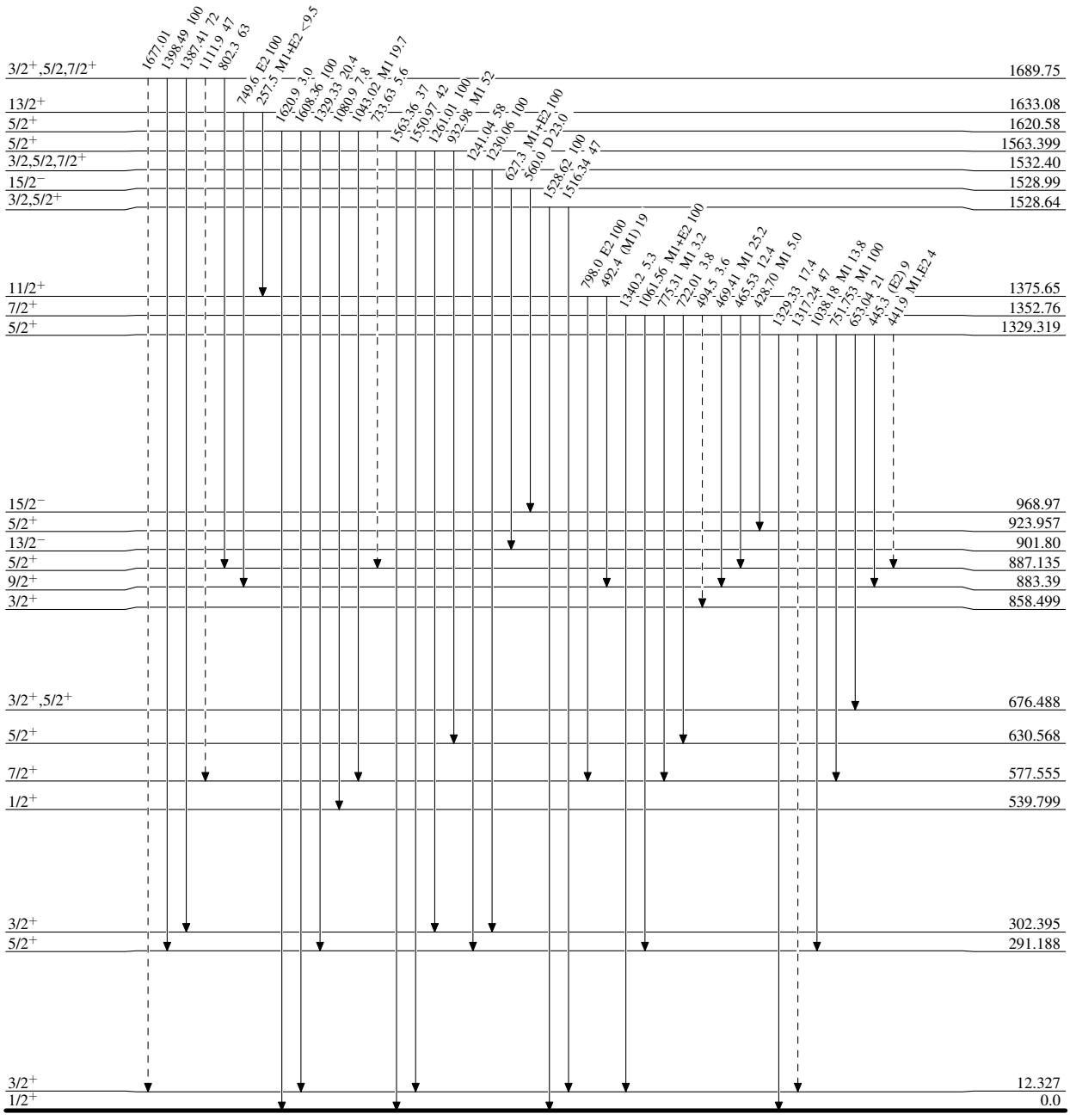
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)



$^{133}_{56}Ba_{77}$

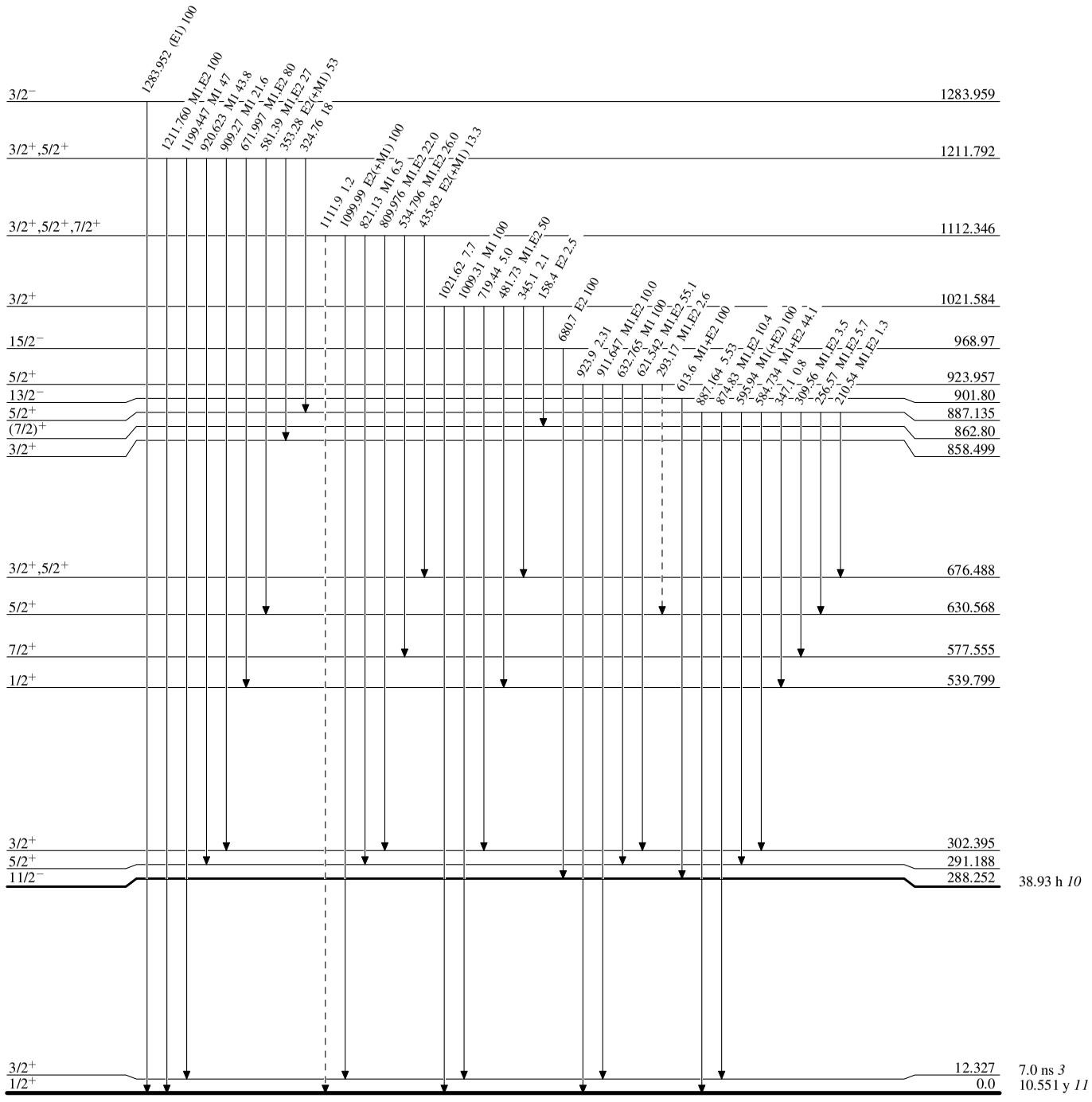
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

– – – – – – ► γ Decay (Uncertain)

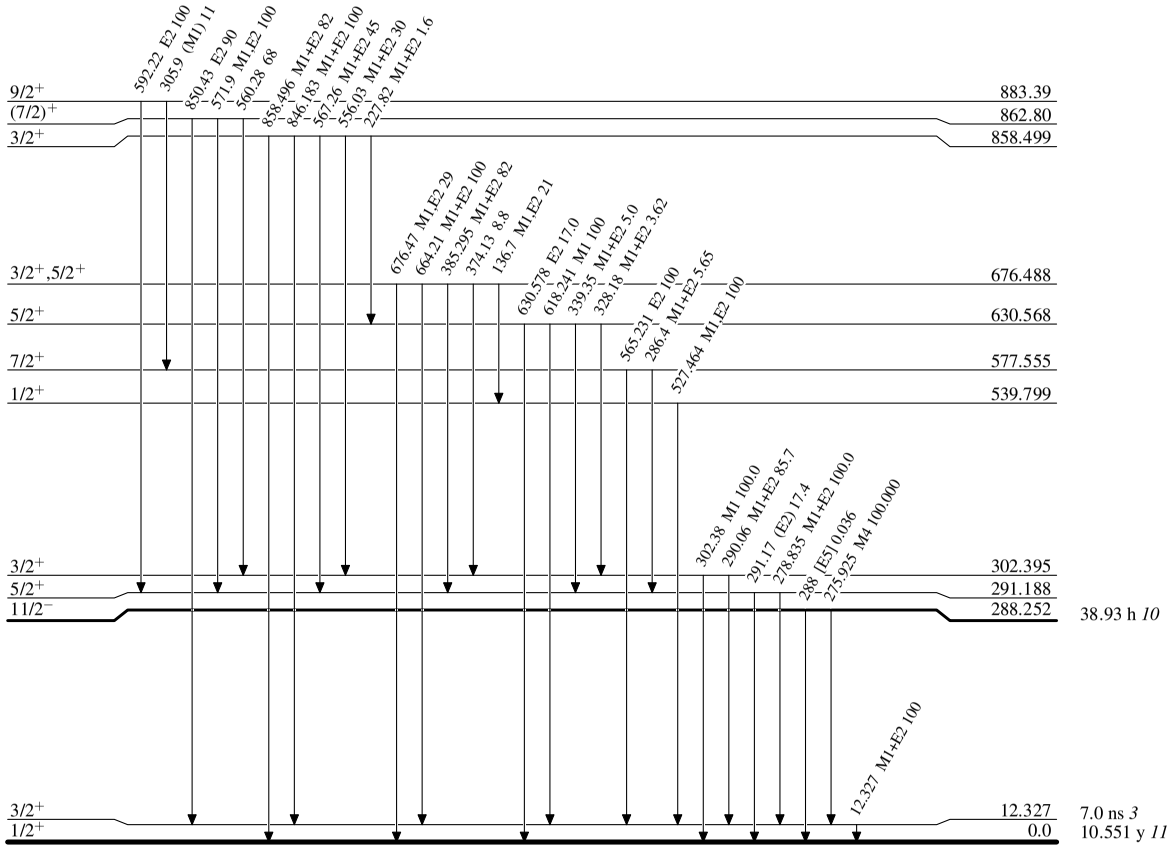


$^{133}_{56}Ba_{77}$

Adopted Levels, Gammas

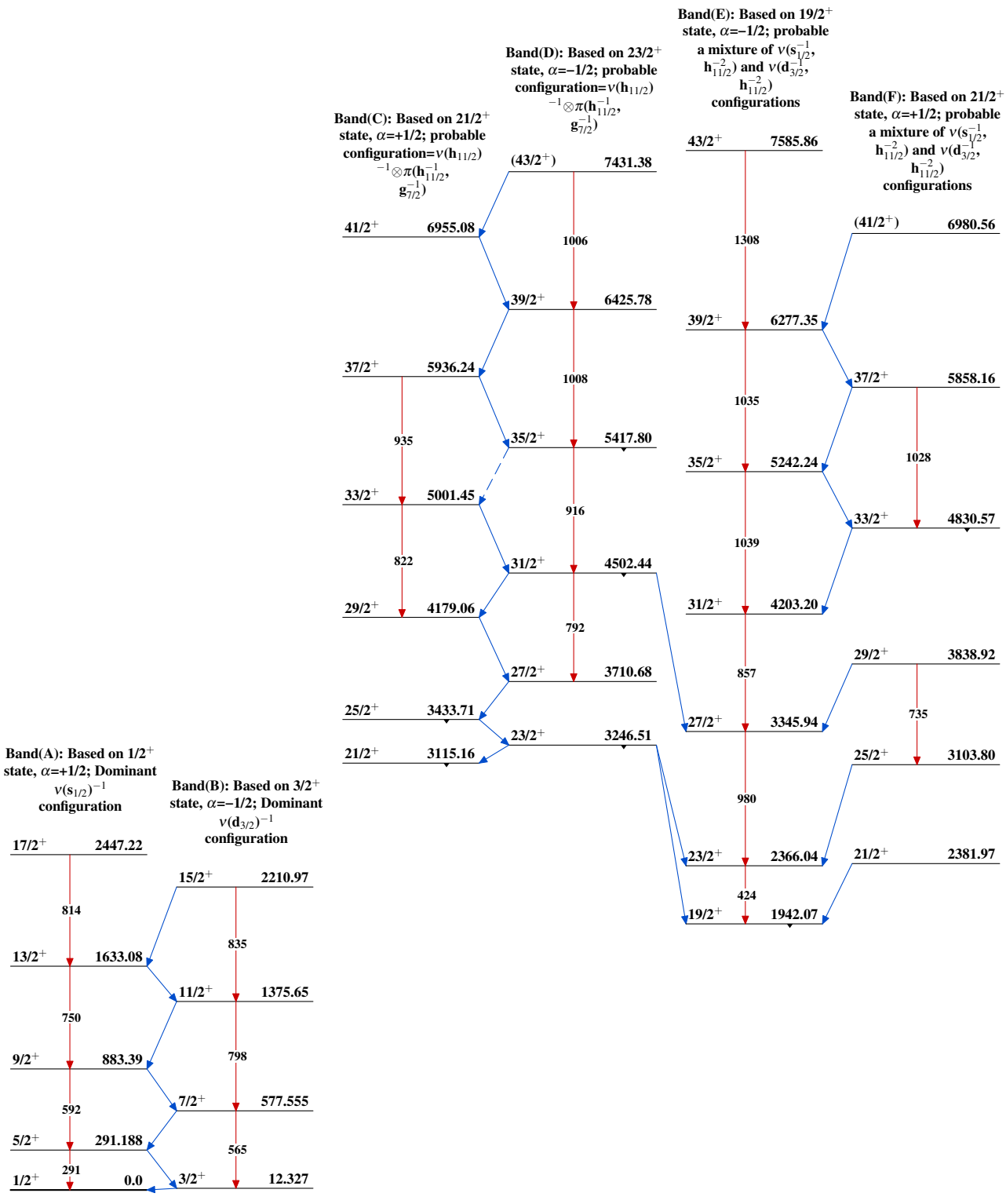
Level Scheme (continued)

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

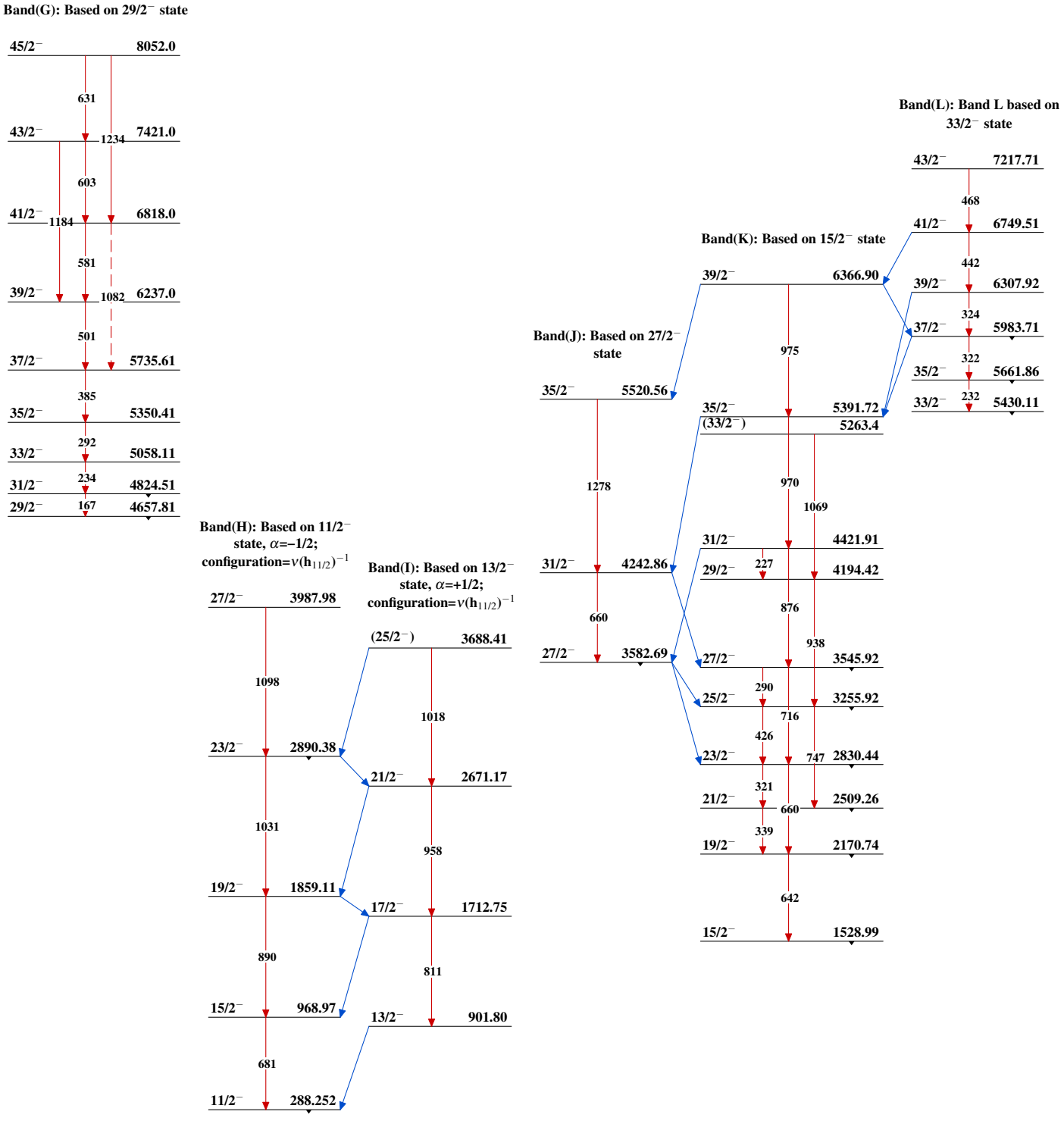


$^{133}_{56}Ba_{77}$

Adopted Levels, Gammas

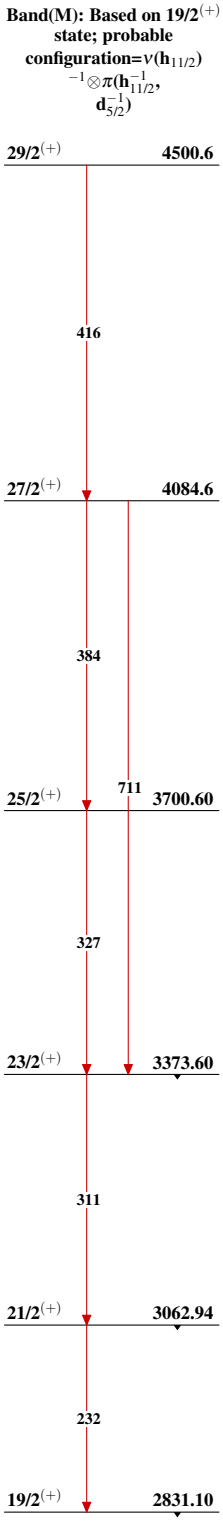


Adopted Levels, Gammas (continued)



$^{133}_{56}Ba_{77}$

Adopted Levels, Gammas (continued)



$^{133}_{56}Ba_{77}$

^{133}Ba IT decay 1965Th05,1980VyZZ,1980Mi13

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov and A. Rodionov, F. G. Kondev	NDS 112, 855 (2011)	31-Oct-2010

Parent: ^{133}Ba: E=288.252 *9*; $J^\pi=11/2^-$; $T_{1/2}$=38.93 h *10*; %IT decay=99.9896 *5*

1980Mi13: ^{133m}Ba decay [from ^{133}Cs(p,n)]; measured γ, $\gamma\gamma$(t); deduced levels, $T_{1/2}$, α(exp). Cyclotron, chemical and mass separations, Ge detectors.

1980VyZZ: ^{133m}Ba decay [from Gd(p,X) E=660 MeV]; measured γ, ce; deduced transitions, subshell ratios. Synchrocyclotron, chemical and mass separations.

1965Th05: ^{133m}Ba decay [from ^{nat}Cs(d,2n) E=20 MeV]; measured ce, γ, ceγ(t), ce-ce(t); deduced levels, $T_{1/2}$, subshell ratios, α(exp). Cyclotron, chemical separation, magnetic lens and iron-free spectrometers, NaI(Tl) detector.

1980AnZG: ^{133m}Ba decay [from Cs(p,n)]; measured Eγ, Iγ, isomer $T_{1/2}$. Cyclotron, chemical procedure.

Others: 1966Ha23, 1979An06, 1981An17, 2011Gr01.

^{133}Ba Levels

E(level)†	J^π†	$T_{1/2}$†	Comments
0.0	$1/2^+$	10.551 y *11*	
12.327 *6*	$3/2^+$	7.0 ns *3*	
288.252 *9*	$11/2^-$	38.93 h *10*	%ε=0.0104 *5*; %IT=99.9896 *5*

† From 'Adopted Levels'.

$\gamma(^{133}$Ba)

Iγ normalization: from $\Sigma(\gamma$+ce)=100 depopulating the 288.252-keV level.

E$_\gamma$‡	I$_\gamma$@	E$_i$(level)	J^π_i	E$_f$	J^π_f	Mult.#	δ	α†	Comments
12.327 *6*	8.01 *25*	12.327	$3/2^+$	0.0	$1/2^+$	M1+E2	≤0.013	69.5 *19*	L1:L2:L3=100:9.6 *20*:3.1 *15* (1965Th05); α(exp)=65 *3* (1980Mi13) α(L)=55.2 *15*; α(M)=11.4 *3*; α(N+..)=2.86 *8* α(N)=2.46 *7*; α(O)=0.373 *9*; α(P)=0.0261 *4* α(L1)=48.6 *7*; α(L2)=4.9 *5*; α(L3)=1.8 *7* I$_\gamma$: calculated by evaluators from intensity balance with 275.9-keV transition and α=69.5 *19*; others: 0.086 *5* (1980Mi13), 0.0515 *25* (1980VyZZ). Mult.,δ: from 1965Th05, 1980Mi13; maximum possible E2 admixture of $\delta^2=1.6\times10^{-4}$. δ: =0.007 *5* calculated with BrIccMixing program by evaluators using the L-subshell ratio of 1965Th05; α=68.9 *20* with that δ.
275.925 *7*	100	288.252	$11/2^-$	12.327	$3/2^+$	M4		4.65	K:L:M:N=100.0 *11*:31.5 *4*:6.68 *12*:1.78 *7* (1980VyZZ) α(K)exp=3.45 *20*; K/L+=2.55 *10* (1965Th05)

Continued on next page (footnotes at end of table)

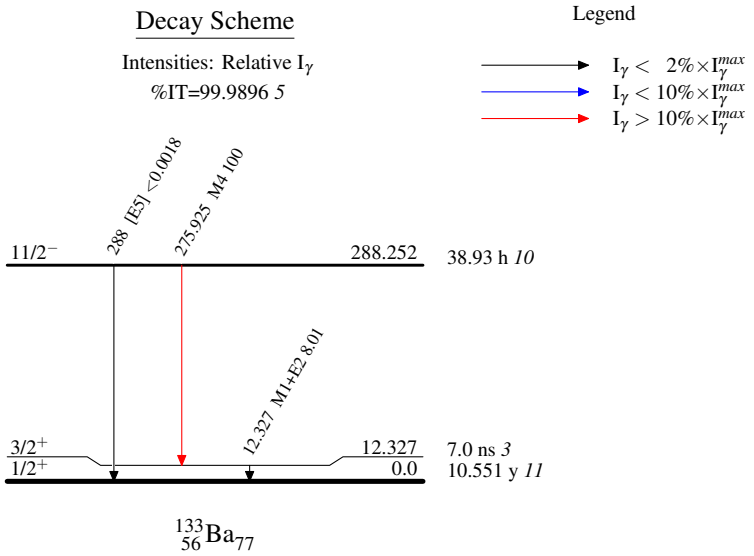
^{133}Ba IT decay 1965Th05,1980VyZZ,1980Mi13 (continued)

$\gamma(^{133}Ba)$ (continued)

E_γ ‡	I_γ @	E_i(level)	J_i^π	E_f	J_f^π	Mult. #	α †	Comments
288 *1*	<0.0018	288.252	11/2$^-$	0.0	1/2$^+$	[E5]	4.08 *11*	α(K)=3.34 *5*; α(L)=1.018 *15*; α(M)=0.229 *4*; α(N+..)=0.0565 *8* α(N)=0.0491 *7*; α(O)=0.00705 *10*; α(P)=0.000352 *5* E_γ: from 2011Gr01 and 1980AnZG: $\Delta E\gamma$=1 keV (assigned by evaluators). I_γ: from 2011Gr01. Other: 0.036 *25* (1980AnZG).

† Additional information 1.
‡ From 1980VyZZ, except as noted.
# From α(K)exp and sub-shell ratios, except as noted.
@ For absolute intensity per 100 decays, multiply by 0.1769 *25*.

^{133}Ba IT decay 1965Th05,1980VyZZ,1980Mi13



^{133}La ε decay (3.912 h) 1976He11,1980VyZZ

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov and A. Rodionov, F. G. Kondev	NDS 112, 855 (2011)	31-Oct-2010

Parent: ^{133}La: E=0.0; $J^\pi=5/2^+$; $T_{1/2}$=3.912 h *8*; Q(ε)=2059 *28*; %ε+%$β^+$ decay=100.0

1976He11: ^{133}La ε decay [from ^{133}Ce ε decay, produced in ^{132}Ba(α,3n)]; measured γ, γ(t), γγ coin.; deduced levels, J^π, α(exp), log *ft*, $T_{1/2}$(^{133}La). Cyclotron, chemical and mass separations, Ge(Li) detectors.

1980VyZZ, 1983JoZX: ^{133}La ε decay [from Gd(p,X) E=660 MeV]; measured γ, ce; deduced levels, J^π. Synchrocyclotron, chemical and mass separations, particle-vibrational coupling model. Others: 1966Ha23, 1973Re05.

^{133}Ba Levels

E(level)†	J^π‡	$T_{1/2}$‡	Comments
0.0	$1/2^+$	10.551 y *11*	
12.326 *6*	$3/2^+$	7.0 ns *3*	
288.251 *9*	$11/2^-$	38.93 h *10*	0.3% of all ^{133}La decays populate the ^{133}Ba isomer (1966Ha23).
291.186 *9*	$5/2^+$		
302.395 *11*	$3/2^+$		
539.800 *13*	$1/2^+$		
577.553 *13*	$7/2^+$		
630.567 *10*	$5/2^+$		
676.486 *12*	$3/2^+$,$5/2^+$		
858.499 *11*	$3/2^+$		
862.80 *9*	$(7/2)^+$		
883.39 *5*	$9/2^+$		
887.134 *12*	$5/2^+$		
923.955 *10*	$5/2^+$		
1021.584 *23*	$3/2^+$		
1112.344 *12*	$3/2^+$,$5/2^+$,$7/2^+$		
1211.792 *12*	$3/2^+$,$5/2^+$		
1283.959 *24*	$3/2^-$		
1329.316 *18*	$5/2^+$		
1352.76 *5*	$7/2^+$		
1528.64 *9*	3/2,$5/2^+$		
1532.40 *8*	3/2,5/2,$7/2^+$		
1563.399 *24*	$5/2^+$		
1620.56 *4*	$5/2^+$		
1689.74 *6*	$3/2^+$,5/2,$7/2^+$		
1706.94 *19*	3/2,$5/2^+$		
1769.70 *5*	3/2,$5/2^+$		
1830.22 *3*	3/2,$5/2^+$		

† From a least-squares fit to Eγ's.
‡ From 'Adopted Levels'.

ε,$β^+$ radiations

E(decay)	E(level)	Iε‡	Log *ft*	I(ε+$β^+$)†‡	Comments
(2.3×10^2 *3*)	1830.22	0.0027 *6*	7.98 *17*	0.0027 *6*	εK=0.811 *8*; εL=0.147 *6*; εM+=0.0424 *20*
(2.9×10^2 *3*)	1769.70	0.0111 *6*	7.60 *11*	0.0111 *6*	εK=0.822 *5*; εL=0.139 *4*; εM+=0.0398 *11*
(3.5×10^2 *3*)	1706.94	0.0120 *9*	7.75 *9*	0.0120 *9*	εK=0.828 *3*; εL=0.1336 *20*; εM+=0.0381 *7*
(3.7×10^2 *3*)	1689.74	0.0177 *22*	7.63 *10*	0.0177 *22*	εK=0.8297 *24*; εL=0.1326 *18*; εM+=0.0378 *6*
(4.4×10^2 *3*)	1620.56	0.061 *4*	7.25 *7*	0.061 *4*	εK=0.8340 *16*; εL=0.1293 *12*; εM+=0.0367 *4*
(5.0×10^2 *3*)	1563.399	0.055 *4*	7.41 *7*	0.055 *4*	εK=0.8366 *12*; εL=0.1274 *9*; εM+=0.0360 *3*

Continued on next page (footnotes at end of table)

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)†‡	Comments
(5.3×10² *3*)	1532.40		0.0061 *7*	8.42 *8*	0.0061 *7*	εK=0.8377 *11*; εL=0.1265 *8*; εM+=0.0358 *3*
(5.3×10² *3*)	1528.64		0.0054 *8*	8.48 *9*	0.0054 *8*	εK=0.8379 *11*; εL=0.1264 *8*; εM+=0.0357 *3*
(7.1×10² *3*)	1352.76		0.131 *9*	7.36 *5*	0.131 *9*	εK=0.8423 *6*; εL=0.1231 *4*; εM+=0.03463 *14*
(7.3×10² *3*)	1329.316		0.079 *5*	7.61 *5*	0.079 *5*	εK=0.8427 *5*; εL=0.1228 *4*; εM+=0.03453 *13*
(7.8×10² *3*)	1283.959		0.062 *5*	7.77 *5*	0.062 *5*	εK=0.8434 *5*; εL=0.1222 *4*; εM+=0.03435 *11*
(8.5×10² *3*)	1211.792		0.168 *11*	7.42 *5*	0.168 *11*	εK=0.8444 *4*; εL=0.1215 *3*; εM+=0.03410 *9*
(9.5×10² *3*)	1112.344		0.318 *17*	7.24 *4*	0.318 *17*	εK=0.8455 *3*; εL=0.12067 *22*; εM+=0.03383 *7*
(1.04×10³ *3*)	1021.584		0.115 *7*	7.77 *4*	0.115 *7*	εK=0.8463 *3*; εL=0.12005 *18*; εM+=0.03363 *6*
(1.14×10³ *3*)	923.955		1.59 *8*	6.71 *4*	1.59 *8*	εK=0.8470 *2*; εL=0.11950 *15*; εM+=0.03345 *5*
(1.17×10³ *3*)	887.134		0.64 *3*	7.13 *3*	0.64 *3*	εK=0.8473 *2*; εL=0.11932 *14*; εM+=0.03339 *5*
(1.20×10³ *3*)	862.80		0.066 *7*	8.13 *5*	0.066 *7*	εK=0.8474 *2*; εL=0.11920 *14*; εM+=0.03335 *5*
(1.20×10³ *3*)	858.499		1.16 *6*	6.89 *3*	1.16 *6*	εK=0.8474 *2*; εL=0.11918 *14*; εM+=0.03334 *5*
(1.38×10³ *3*)	676.486	0.00031 *12*	0.192 *17*	7.80 *5*	0.192 *17*	av Eβ=172 *13*; εK=0.8470 *4*; εL=0.11828 *17*; εM+=0.03306 *5*
(1.43×10³ *3*)	630.567	0.0025 *8*	0.95 *5*	7.13 *3*	0.95 *5*	av Eβ=192 *13*; εK=0.8464 *6*; εL=0.11800 *19*; εM+=0.03297 *6*
(1.48×10³ *3*)	577.553	0.0019 *5*	0.43 *3*	7.51 *4*	0.43 *3*	av Eβ=216 *13*; εK=0.8451 *9*; εL=0.11764 *22*; εM+=0.03286 *7*
(1.76×10³ *3*)	302.395	0.054 *8*	2.10 *11*	6.97 *3*	2.15 *11*	av Eβ=336 *13*; εK=0.828 *3*; εL=0.1145 *5*; εM+=0.03195 *14*
(1.77×10³ *3*)	291.186	0.030 *5*	1.10 *11*	7.26 *5*	1.13 *11*	av Eβ=341 *13*; εK=0.827 *3*; εL=0.1143 *5*; εM+=0.03190 *14*
(2.05×10³ *3*)	12.326	7.1 *8*	84 *6*	5.51 *4*	91 *7*	av Eβ=463 *13*; εK=0.784 *6*; εL=0.1079 *9*; εM+=0.03008 *24*

† From intensity balances.
‡ Absolute intensity per 100 decays.

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ (continued)

γ(^{133}Ba)

Iγ normalization: from Σ(I(γ+ce) to g.s.)=100 and by assuming that there is no direct ε-decay feeding to the ^{133}Ba g.s. ($J^\pi=1/2^+$); I($\gamma^\pm$)/Iγ(278γ)=4.58 *11* (1976He11).

E_γ ‡	I_γ ‡&	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ	α†	Comments
12.327 *6*	56.4 *28*	12.326	3/2+	0.0	1/2+	M1+E2	≤0.013	69.5 *19*	α(L)=55.2 *15*; α(M)=11.4 *3*; α(N+..)=2.86 *8* α(N)=2.46 *7*; α(O)=0.373 *9*; α(P)=0.0261 *4* Mult.,δ: from 'Adopted Levels and gammas'. Iγ: from I(γ+ce)=3976 *164* deduced using Iγ(±)=458 *11* (1976He11), ε/β+=15.2 (theory 1972Dz09 with assumed uncertainty of 3%) and ΣI(γ+ce)=266 4, the total intensity feeding this state.
x113.43 *6*	0.21 *4*					M1,E2		1.0 *3*	ce(K)=38 *6*; ce(L23)=9 *2*; ce(M)=2.3 *4*; α(K)exp=0.8 *2* (1966Ha23) α(K)=0.71 *12*; α(L)=0.20 *13*; α(M)=0.04 *3*; α(N+..)=0.010 *7* α(N)=0.009 *6*; α(O)=0.0012 *7*; α(P)=3.89×10^{-5} *6*
136.7@ *2*	0.8@ *3*	676.486	3/2+,5/2+	539.800	1/2+	M1,E2		0.52 *12*	ce(K)=7 *1* (1966Ha23) α(K)exp=0.4 *2* α(K)=0.40 *6*; α(L)=0.10 *5*; α(M)=0.020 *11*; α(N+..)=0.005 *3* α(N)=0.0043 *23*; α(O)=0.0006 *3*; α(P)=2.27×10^{-5} *5*
158.4@ *3*	0.07@ *3*	1021.584	3/2+	862.80	(7/2)+	E2		0.33 *6*	ce(K)=4 *1*; α(K)exp=0.26 *12* (1966Ha23) α(K)=0.26 *3*; α(L)=0.055 *24*; α(M)=0.012 *6*; α(N+..)=0.0028 *12* α(N)=0.0024 *11*; α(O)=0.00035 *14*; α(P)=1.48×10^{-5} *5* Eγ: this transition questionably populates the 862.80-keV level in 1976He11, however, the level energy difference (158.78 *9*) fits.
210.54 *6*	0.20 *5*	887.134	5/2+	676.486	3/2+,5/2+	M1,E2		0.135 *11*	ce(K)=10 *2* (1966Ha23) α(K)exp=0.23 *8* α(K)=0.110 *4*; α(L)=0.020 *6*; α(M)=0.0041 *13*; α(N+..)=0.0010 *3* α(N)=0.00087 *25*; α(O)=0.00013 *3*; α(P)=6.5×10^{-6} *5*
227.82 *6*	0.31 *5*	858.499	3/2+	630.567	5/2+	M1,E2		0.106 *6*	ce(K)=8 *2* (1966Ha23) α(K)exp=0.15 *4* α(K)=0.0870 *15*; α(L)=0.015 *4*; α(M)=0.0031 *8*; α(N+..)=0.00077 *18* α(N)=0.00067 *16*; α(O)=9.7×10^{-5} *20*; α(P)=5.2×10^{-6} *5*
256.57@ *6*	0.91@ *6*	887.134	5/2+	630.567	5/2+	M1,E2		0.0741 *14*	ce(K)=16.5 *25* (1966Ha23) α(K)exp=0.076 *12*

$^{133}_{56}Ba_{77}$-3

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ (continued)

γ(^{133}Ba) (continued)

E_γ[‡]	I_γ[‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ	α[†]	Comments
									α(K)=0.0614 *17*; α(L)=0.0100 *18*; α(M)=0.0021 *4*; α(N+..)=0.00052 *9* α(N)=0.00045 *8*; α(O)=6.6×10^{-5} *10*; α(P)=3.7×10^{-6} *4* E_γ: level energy difference is 256.547 *14*; 256.340 *26* in 1980VyZZ.
275.925 *7*		288.251	11/2$^-$	12.326	3/2$^+$	M4		4.65	α(K)=3.34 *5*; α(L)=1.018 *15*; α(M)=0.229 *4*; α(N+..)=0.0565 *8* α(N)=0.0491 *7*; α(O)=0.00705 *10*; α(P)=0.000352 *5* E_γ,Mult.: from 'Adopted Levels and gammas'.
278.835 *17*	100.0 *32*	291.186	5/2$^+$	12.326	3/2$^+$	M1+E2	0.9 *16*	0.0580 *11*	ce(K)=100×10^1 *15*; ce(L)=145 *25*; ce(M)=35 *6* (1966Ha23) α(K)exp=0.044 *7*; α(L)exp=0.0064 *11*; α(M)exp=0.0016 *3* α(K)=0.0485 *21*; α(L)=0.0075 *10*; α(M)=0.00157 *22*; α(N+..)=0.00039 *5* α(N)=0.00034 *5*; α(O)=5.0×10^{-5} *5*; α(P)=3.0×10^{-6} *4* δ: calculated by evaluators from I(ce) data (1966Ha23) using the BrIccMixing program.
[x]281.8[@] *2*	0.5[@] *2*								
286.4[@] *4*	1.22[@] *4*	577.553	7/2$^+$	291.186	5/2$^+$	M1,E2		0.0536 *14*	ce(K)=11 *2* (1966Ha23); α(K)exp=0.041 *8* α(K)=0.0447 *24*; α(L)=0.0070 *9*; α(M)=0.00147 *20*; α(N+..)=0.00036 *5* α(N)=0.00031 *4*; α(O)=4.6×10^{-5} *5*; α(P)=2.7×10^{-6} *4*
290.06[@] *5*	56.5[@] *5*	302.395	3/2$^+$	12.326	3/2$^+$	M1+E2	1.0 *12*	0.0521 *13*	ce(K)=520 *80*; ce(L)=70 *10*; ce(M)=18 *3* (1966Ha23) α(K)exp=0.041 *6*; α(L)exp=0.0056 *8*; α(M)exp=0.0014 *2* α(K)=0.0439 *21*; α(L)=0.0065 *7*; α(M)=0.00135 *16*; α(N+..)=0.00033 *4* α(N)=0.00029 *3*; α(O)=4.3×10^{-5} *4*; α(P)=2.8×10^{-6} *3* δ: Calculated by evaluators with BrIccMixing program from ce(K)=520 *80*, ce(L1)=70 *10* and ce(M)=18 *3* (1966Ha23). E_γ: level energy difference is 290.044 *8*; 290.275 *22* in 1980VyZZ.
291.17[@] *5*	17.4[@] *3*	291.186	5/2$^+$	0.0	1/2$^+$	(E2)		0.0497	ce(K)≈120; ce(L)≈25 (1966Ha23) α(K)exp≈0.030; α(L)exp≈0.0065 α(K)=0.0403 *6*; α(L)=0.00743 *11*; α(M)=0.001568 *22*; α(N+..)=0.000382 *6* α(N)=0.000332 *5*; α(O)=4.76×10^{-5} *7*; α(P)=2.28×10^{-6} *4*
293.17[@b] *11*	1.0[@] *2*	923.955	5/2$^+$	630.567	5/2$^+$	M1,E2		0.0501 *16*	ce(K)≈11; ce(L)≈2 (1966Ha23) α(K)exp≈0.050; α(L)exp≈0.009 α(K)=0.0419 *25*; α(L)=0.0065 *8*; α(M)=0.00136 *17*; α(N+..)=0.00034 *4* α(N)=0.00029 *4*; α(O)=4.3×10^{-5} *4*; α(P)=2.6×10^{-6} *4* E_γ: this transition questionably populates the 630.567-keV level (1976He11), poor fit, the level energy difference = 293.388 *12*.
302.38[@] *4*	65.9[@] *21*	302.395	3/2$^+$	0.0	1/2$^+$	M1		0.0475	ce(K)=604 *21*; ce(L)=69 *8*; ce(M)=15 *4* α(L)exp=0.0047 *6*; α(M)exp=0.0010 *3*

$^{133}_{56}Ba_{77}$-4

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ (continued)

γ(^{133}Ba) (continued)

E_γ [‡]	I_γ [‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	α [†]	Comments
								α(K)=0.0408 *6*; α(L)=0.00534 *8*; α(M)=0.001098 *16*; α(N+..)=0.000276 *4*
								α(N)=0.000237 *4*; α(O)=3.63×10^{-5} *5*; α(P)=2.66×10^{-6} *4*
309.56 *5*	0.55 *5*	887.134	5/2$^+$	577.553	7/2$^+$	M1,E2	0.0428 *20*	ce(K)=5.8 *18*; α(K)exp=0.047 *15* α(K)=0.036 *3*; α(L)=0.0055 *5*; α(M)=0.00115 *12*; α(N+..)=0.000283 *25* α(N)=0.000245 *23*; α(O)=3.63×10^{-5} *22*; α(P)=2.2×10^{-6} *3*
324.76 *10*	0.32 *5*	1211.792	3/2$^+$,5/2$^+$	887.134	5/2$^+$			
328.18 *3*	1.19 *7*	630.567	5/2$^+$	302.395	3/2$^+$	M1+E2	0.0362 *23*	ce(L)=1.2 *3*; α(L)exp=0.0046 *12* α(K)=0.030 *3*; α(L)=0.0046 *3*; α(M)=0.00095 *8*; α(N+..)=0.000236 *15* α(N)=0.000204 *14*; α(O)=3.04×10^{-5} *12*; α(P)=1.9×10^{-6} *3*
339.35 *4*	1.63 *16*	630.567	5/2$^+$	291.186	5/2$^+$	M1+E2	0.0329 *23*	ce(K)=11 *3*; ce(L)=1.4 *4*; α(K)exp=0.030 *8*; α(L)exp=0.0039 *11* α(K)=0.028 *3*; α(L)=0.00414 *21*; α(M)=0.00086 *6*; α(N+..)=0.000213 *11* α(N)=0.000184 *10*; α(O)=2.74×10^{-5} *8*; α(P)=1.7×10^{-6} *3*
345.1[@] *4*	0.06[@] *5*	1021.584	3/2$^+$	676.486	3/2$^+$,5/2$^+$			E_γ: this transition questionably populates the 676.486-keV level in 1976He11, however, the level energy difference (345.098 *25*) fits.
347.1[@] *3*	0.13[@] *6*	887.134	5/2$^+$	539.800	1/2$^+$			
353.28 *4*	0.94 *7*	1211.792	3/2$^+$,5/2$^+$	858.499	3/2$^+$	E2	0.0271	ce(K)=3.8 *7*; α(K)exp=0.018 *4* α(K)=0.0223 *4*; α(L)=0.00378 *6*; α(M)=0.000794 *12*; α(N+..)=0.000195 *3* α(N)=0.0001687 *24*; α(O)=2.45×10^{-5} *4*; α(P)=1.296×10^{-6} *19*
[x]355.97 *3*	1.19 *6*					E1	0.00738 *11*	ce(K)=1.3 *3*; α(K)exp=0.0041 *12* α=0.00738 *11*; α(K)=0.00636 *9*; α(L)=0.000810 *12*; α(M)=0.0001659 *24*; α(N+..)=4.14×10^{-5} *6* α(N)=3.56×10^{-5} *5*; α(O)=5.39×10^{-6} *8*; α(P)=3.75×10^{-7} *6*
374.13 *9*	0.33 *5*	676.486	3/2$^+$,5/2$^+$	302.395	3/2$^+$			
385.295 *14*	3.10 *11*	676.486	3/2$^+$,5/2$^+$	291.186	5/2$^+$	M1+E2	0.0231 *23*	ce(K)=16 *5*; ce(L)=2.5 *7*; ce(M)=0.7 *3* α(K)exp=0.023 *8*; α(L)exp=0.0036 *3*; α(M)exp=0.0010 *4* α(K)=0.0196 *23*; α(L)=0.00283 *4*; α(M)=0.000588 *10*; α(N+..)=0.0001461 *21* α(N)=0.0001260 *18*; α(O)=1.89×10^{-5} *5*; α(P)=1.22×10^{-6} *21*
428.7[@] *2*	0.17[@] *6*	1352.76	7/2$^+$	923.955	5/2$^+$	M1	0.0194	ce(K)=1.0 *3*; α(K)exp=0.021 *6* α(K)=0.01665 *24*; α(L)=0.00215 *3*; α(M)=0.000443 *7*; α(N+..)=0.0001113 *16* α(N)=9.56×10^{-5} *14*; α(O)=1.467×10^{-5} *21*; α(P)=1.081×10^{-6} *16* E_γ: 428.53 *9* is placed from the 1351-keV (3/2$^+$,5/2$^+$) level (1980VyZZ), but this level is not supported by others, the level energy difference is equal to 428.74 *5*.
[x]432.3[@b] *3*	0.09[@] *5*							

$^{133}_{56}Ba_{77}$-5

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ (continued)

γ(^{133}Ba) (continued)

E_γ[‡]	I_γ[‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[†]	Comments
435.82 *3*	1.02 *6*	1112.344	3/2$^+$,5/2$^+$,7/2$^+$	676.486	3/2$^+$,5/2$^+$	E2	0.01452	ce(K)=2.6 *5*; α(K)exp=0.012 *3* α(K)=0.01212 *17*; α(L)=0.00190 *3*; α(M)=0.000398 *6*; α(N+..)=9.79×10^{-5} *14* α(N)=8.47×10^{-5} *12*; α(O)=1.247×10^{-5} *18*; α(P)=7.20×10^{-7} *10*
441.9[@] *4*	0.07[@] *5*	1329.316	5/2$^+$	887.134	5/2$^+$	M1,E2	0.0159 *20*	ce(K)=0.35 *12*; α(K)exp=0.023 *10* α(K)=0.0135 *19*; α(L)=0.00191 *9*; α(M)=0.000395 *16*; α(N+..)=9.8×10^{-5} *5* α(N)=8.5×10^{-5} *4*; α(O)=1.28×10^{-5} *9*; α(P)=8.5×10^{-7} *16* E_γ: this transition questionably populates the 887.134-keV level in 1976He11, the level energy difference = 442.182 *19*.
445.3[@] *3*	0.17[@] *10*	1329.316	5/2$^+$	883.39	9/2$^+$	(E2)	0.01365	ce(K)=0.7 *3*; α(K)exp=0.019 *12* α(K)=0.01141 *17*; α(L)=0.00178 *3*; α(M)=0.000371 *6*; α(N+..)=9.15×10^{-5} *13* α(N)=7.92×10^{-5} *12*; α(O)=1.166×10^{-5} *17*; α(P)=6.79×10^{-7} *10* E_γ: poor fit, the level energy difference = 445.93 *5*. Mult.: M1,E2 from conversion data. M1 ruled out from placement in level scheme.
465.53[@] *11*	0.42[@] *6*	1352.76	7/2$^+$	887.134	5/2$^+$			
469.41 *5*	0.85 *6*	1352.76	7/2$^+$	883.39	9/2$^+$	M1	0.01541	ce(K)=2.5 *3*; α(K)exp=0.013 *2* α(K)=0.01326 *19*; α(L)=0.001709 *24*; α(M)=0.000351 *5*; α(N+..)=8.84×10^{-5} *13* α(N)=7.58×10^{-5} *11*; α(O)=1.164×10^{-5} *17*; α(P)=8.60×10^{-7} *12*
481.73 *3*	1.39 *8*	1021.584	3/2$^+$	539.800	1/2$^+$	M1,E2	0.0127 *18*	ce(K)=3.0 *4*; α(K)exp=0.0096 *13* α(K)=0.0108 *17*; α(L)=0.00150 *11*; α(M)=0.000310 *20*; α(N+..)=7.7×10^{-5} *6* α(N)=6.7×10^{-5} *5*; α(O)=1.00×10^{-5} *9*; α(P)=6.8×10^{-7} *13*
494.5[@] *3*	0.12[@] *6*	1352.76	7/2$^+$	858.499	3/2$^+$			E_γ: this transition populates the 858.499-keV level questionably (1976He11), the level energy difference = 494.20 *5*.
[x]519.1[@] *4*	0.9[@] *3*							
527.464 *15*	3.22 *11*	539.800	1/2$^+$	12.326	3/2$^+$	M1,E2	0.0100 *16*	ce(K)=6.0 *5*; α(K)exp=0.0083 *8* α(K)=0.0085 *14*; α(L)=0.00117 *11*; α(M)=0.000242 *21*; α(N+..)=6.0×10^{-5} *6* α(N)=5.2×10^{-5} *5*; α(O)=7.9×10^{-6} *9*; α(P)=5.4×10^{-7} *11*
534.796 *10*	2.00 *7*	1112.344	3/2$^+$,5/2$^+$,7/2$^+$	577.553	7/2$^+$	M1,E2	0.0097 *15*	ce(K)=3.7 *4*; α(K)exp=0.0082 *9* α=0.0097 *15*; α(K)=0.0083 *14*; α(L)=0.00113 *11*; α(M)=0.000233 *21*; α(N+..)=5.8×10^{-5} *6* α(N)=5.0×10^{-5} *5*; α(O)=7.6×10^{-6} *9*; α(P)=5.2×10^{-7} *11*
[x]540.45 *3*	0.553 *28*							ce(K)=0.7 *3*; α(K)exp=0.006 *3*
556.03 *22*	5.7 *12*	858.499	3/2$^+$	302.395	3/2$^+$	M1,E2	0.0088 *14*	ce(K)=8.3 *8*; ce(L)=0.7 *3*; α(K)exp=0.0065 *14*; α(L)exp=0.0006 *3*

$^{133}_{56}Ba_{77}$-6

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ (continued)

γ(^{133}Ba) (continued)

E_γ ‡	I_γ ‡&	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	α†	Comments
								α=0.0088 *14*; α(K)=0.0075 *13*; α(L)=0.00102 *11*; α(M)=0.000210 *20*; α(N+..)=5.2×10^{-5} *6* α(N)=4.5×10^{-5} *5*; α(O)=6.8×10^{-6} *8*; α(P)=4.7×10^{-7} *10*
560.28 *21*	0.73 *21*	862.80	(7/2)$^+$	302.395	3/2$^+$			
565.231 *20*	21.6 *8*	577.553	7/2$^+$	12.326	3/2$^+$	E2	0.00708 *10*	ce(K)=34.8 *13*; α(K)exp= 0.0072 *4* α=0.00708 *10*; α(K)=0.00598 *9*; α(L)=0.000872 *13*; α(M)=0.000181 *3*; α(N+..)=4.49×10^{-5} *7* α(N)=3.87×10^{-5} *6*; α(O)=5.78×10^{-6} *8*; α(P)=3.63×10^{-7} *5* Mult.: E2,M1 from conversion data. M1 ruled out from placement in the level scheme.
567.26 *4*	8.4 *4*	858.499	3/2$^+$	291.186	5/2$^+$	M1,E2	0.0083 *14*	ce(K)=9.7 *6*; α(K)exp=0.0051 *4* α=0.0083 *14*; α(K)=0.0071 *12*; α(L)=0.00096 *10*; α(M)=0.000199 *20*; α(N+..)=5.0×10^{-5} *6* α(N)=4.3×10^{-5} *5*; α(O)=6.5×10^{-6} *8*; α(P)=4.5×10^{-7} *9*
571.9 *3*	1.08 *10*	862.80	(7/2)$^+$	291.186	5/2$^+$	M1,E2	0.0082 *13*	ce(K)=1.2 *3*; α(K)exp=0.0050 *13* α=0.0082 *13*; α(K)=0.0070 *12*; α(L)=0.00094 *10*; α(M)=0.000195 *20*; α(N+..)=4.9×10^{-5} *6* α(N)=4.2×10^{-5} *5*; α(O)=6.3×10^{-6} *8*; α(P)=4.4×10^{-7} *9*
581.39 *8*	0.48 *5*	1211.792	3/2$^+$,5/2$^+$	630.567	5/2$^+$	M1,E2	0.0078 *13*	ce(K)=0.98 *30*; α(K)exp=0.0083 *30* α=0.0078 *13*; α(K)=0.0067 *12*; α(L)=0.00090 *10*; α(M)=0.000186 *20*; α(N+..)=4.7×10^{-5} *6* α(N)=4.0×10^{-5} *5*; α(O)=6.1×10^{-6} *8*; α(P)=4.2×10^{-7} *9* E_γ: poor fit, the level energy difference = 581.224 *14*. Mult.: M1,(E2) in 1983JoZX.
584.734 *10*	7.01 *23*	887.134	5/2$^+$	302.395	3/2$^+$	M1+E2	0.0077 *13*	ce(K)=9.8 *3*; α(K)exp=0.0063 *3* α=0.0077 *13*; α(K)=0.0066 *12*; α(L)=0.00089 *10*; α(M)=0.000183 *20*; α(N+..)=4.6×10^{-5} *6* α(N)=3.9×10^{-5} *5*; α(O)=6.0×10^{-6} *8*; α(P)=4.2×10^{-7} *9*
592.22 *5*	1.30 *8*	883.39	9/2$^+$	291.186	5/2$^+$	E2	0.00626 *9*	ce(K)=2.0 *5*; α(K)exp=0.0068 *18* α=0.00626 *9*; α(K)=0.00530 *8*; α(L)=0.000764 *11*; α(M)=0.0001586 *23*; α(N+..)=3.93×10^{-5} *6* α(N)=3.39×10^{-5} *5*; α(O)=5.07×10^{-6} *8*; α(P)=3.23×10^{-7} *5* Mult.: E2,M1 from conversion data. M1 ruled out from placement in level scheme.
595.94 *9*	15.9 *5*	887.134	5/2$^+$	291.186	5/2$^+$	M1(+E2)	0.0074 *12*	ce(K)=28.4 *11*; ce(L)=5.0 *10*; α(K)exp=0.0079 *5*; α(L)exp=0.0014 *3* α=0.0074 *12*; α(K)=0.0063 *11*; α(L)=0.00085 *10*; α(M)=0.000174 *19*; α(N+..)=4.4×10^{-5} *5* α(N)=3.8×10^{-5} *5*; α(O)=5.7×10^{-6} *8*; α(P)=4.0×10^{-7} *8*
[x]604.37 *22*	0.12 *5*							
618.241 *11*	32.9 *12*	630.567	5/2$^+$	12.326	3/2$^+$	M1	0.00781 *11*	ce(K)=52.7 *20*; ce(L)=6.5 *3*; α(K)exp=0.0074 *4*; α(L)exp=0.00089 *5* α=0.00781 *11*; α(K)=0.00673 *10*; α(L)=0.000859 *12*; α(M)=0.0001764 *25*; α(N+..)=4.44×10^{-5} α(N)=3.81×10^{-5} *6*; α(O)=5.85×10^{-6} *9*; α(P)=4.34×10^{-7} *6*

$^{133}_{56}Ba_{77}$-7

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ (continued)

γ(^{133}Ba) (continued)

E_γ[‡]	I_γ[‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[†]	Comments
621.542 *14*	21.5 *3*	923.955	5/2$^+$	302.395	3/2$^+$	M1,E2	0.0066 *11*	ce(K)=24 *5*; ce(L)=4.1 *4*; α(K)exp=0.0049 *11*; α(L)exp=0.00085 *9* α=0.0066 *11*; α(K)=0.0057 *10*; α(L)=0.00076 *9*; α(M)=0.000156 *18*; α(N+..)=3.9×10^{-5} *5* α(N)=3.4×10^{-5} *4*; α(O)=5.1×10^{-6} *7*; α(P)=3.6×10^{-7} *8*
630.578 *25*	5.6 *2*	630.567	5/2$^+$	0.0	1/2$^+$	E2	0.00533 *8*	ce(K)=5.6 *4*; α(K)exp=0.0045 *4* α=0.00533 *8*; α(K)=0.00452 *7*; α(L)=0.000643 *9*; α(M)=0.0001332 *19*; α(N+..)=3.31×10^{-5} *5* α(N)=2.85×10^{-5} *4*; α(O)=4.27×10^{-6} *6*; α(P)=2.76×10^{-7} *4*
632.765 *8*	39.0 *12*	923.955	5/2$^+$	291.186	5/2$^+$	M1	0.00738 *11*	ce(K)=59 *3*; ce(L)=8.3 *5*; ce(M)=1.3 *4* α(K)exp=0.0067 *4*; α(L)exp=0.00095 *6*; α(M)exp=0.00015 *5* α=0.00738 *11*; α(K)=0.00636 *9*; α(L)=0.000812 *12*; α(M)=0.0001666 *24*; α(N+..)=4.19×10^{-5} *6* α(N)=3.60×10^{-5} *5*; α(O)=5.53×10^{-6} *8*; α(P)=4.10×10^{-7} *6*
653.04 *11*	0.41 *7*	1329.316	5/2$^+$	676.486	3/2$^+$,5/2$^+$			
664.21[@] *13*	3.77[@] *10*	676.486	3/2$^+$,5/2$^+$	12.326	3/2$^+$	M1+E2	0.0056 *10*	ce(K)=4.0 *9*; α(K)exp=0.0047 *11* α=0.0056 *10*; α(K)=0.0048 *9*; α(L)=0.00064 *9*; α(M)=0.000132 *17*; α(N+..)=3.3×10^{-5} *5* α(N)=2.8×10^{-5} *4*; α(O)=4.3×10^{-6} *6*; α(P)=3.0×10^{-7} *6* E_γ: level energy difference is 664.155 *12*; 664.009 *23* in 1980VyZZ.
671.997 *17*	1.4 *3*	1211.792	3/2$^+$,5/2$^+$	539.800	1/2$^+$	M1,E2	0.0055 *10*	ce(K)=1.3 *3*; α(K)exp=0.0041 *13* α=0.0055 *10*; α(K)=0.0047 *9*; α(L)=0.00062 *8*; α(M)=0.000128 *16*; α(N+..)=3.2×10^{-5} *5* α(N)=2.8×10^{-5} *4*; α(O)=4.2×10^{-6} *6*; α(P)=3.0×10^{-7} *6*
676.47 *2*	1.1 *3*	676.486	3/2$^+$,5/2$^+$	0.0	1/2$^+$	M1,E2	0.0054 *9*	ce(K)=1.1 *3*; α(K)exp=0.0044 *17* α=0.0054 *9*; α(K)=0.0046 *8*; α(L)=0.00061 *8*; α(M)=0.000126 *16*; α(N+..)=3.1×10^{-5} *5* α(N)=2.7×10^{-5} *4*; α(O)=4.1×10^{-6} *6*; α(P)=2.9×10^{-7} *6*
[x]682.0[@] *5*	0.09[@] *5*							
[x]684.3[@] *5*	0.08[@] *5*							
[x]689.5[@] *3*	0.10[@] *5*							
719.44 *14*	0.14 *3*	1021.584	3/2$^+$	302.395	3/2$^+$			
722.01 *15*	0.127 *23*	1352.76	7/2$^+$	630.567	5/2$^+$			
733.63[b] *10*	0.094 *15*	1620.56	5/2$^+$	887.134	5/2$^+$			ce(K)=0.26 *8*; α(K)exp=0.012 *4* E_γ: poor fit: the level energy difference is equal to 733.36 *3*. Mult.: α(K)exp value does not correspond to mult.=D or E2.
751.753 *15*	1.96 *7*	1329.316	5/2$^+$	577.553	7/2$^+$	M1	0.00488 *7*	ce(K)=1.9 *4*; α(K)exp=0.0044 *8* α=0.00488 *7*; α(K)=0.00421 *6*; α(L)=0.000534 *8*; α(M)=0.0001095 *16*; α(N+..)=2.76×10^{-5} *4* α(N)=2.36×10^{-5} *4*; α(O)=3.64×10^{-6} *5*; α(P)=2.71×10^{-7} *4*

$^{133}_{56}Ba_{77}$-8

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ (continued)

γ(^{133}Ba) (continued)

E_γ ‡	I_γ ‡&	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	α†	Comments
775.31 *18*	0.109 *25*	1352.76	7/2$^+$	577.553	7/2$^+$	M1	0.00453 *7*	ce(K)=0.15 *5*; α(K)exp=0.006 *3* α=0.00453 *7*; α(K)=0.00391 *6*; α(L)=0.000495 *7*; α(M)=0.0001017 *15*; α(N+..)=2.56×10^{-5} *4* α(N)=2.20×10^{-5} *3*; α(O)=3.38×10^{-6} *5*; α(P)=2.51×10^{-7} *4*
802.3@ *4*	0.12@ *6*	1689.74	3/2$^+$,5/2,7/2$^+$	887.134	5/2$^+$			
809.976 *19*	1.69 *6*	1112.344	3/2$^+$,5/2$^+$,7/2$^+$	302.395	3/2$^+$	M1,E2	0.0035 *6*	ce(K)=1.0 *2*; ce(L)=0.16 *4*; α(K)exp=0.0026 *6*; α(L)exp=0.00043 *11* α=0.0035 *6*; α(K)=0.0030 *6*; α(L)=0.00039 *6*; α(M)=8.0×10^{-5} *12*; α(N+..)=2.0×10^{-5} *3* α(N)=1.73×10^{-5} *25*; α(O)=2.6×10^{-6} *4*; α(P)=1.9×10^{-7} *4*
821.13 *3*	0.50 *3*	1112.344	3/2$^+$,5/2$^+$,7/2$^+$	291.186	5/2$^+$	M1	0.00395 *6*	ce(K)=0.40 *5*; α(K)exp=0.0036 *5* α=0.00395 *6*; α(K)=0.00341 *5*; α(L)=0.000432 *6*; α(M)=8.86×10^{-5} *13*; α(N+..)=2.23×10^{-5} *4* α(N)=1.91×10^{-5} *3*; α(O)=2.94×10^{-6} *5*; α(P)=2.19×10^{-7} *3*
846.183 *15*	18.9 *6*	858.499	3/2$^+$	12.326	3/2$^+$	M1,E2	0.0032 *6*	ce(K)=10 *3*; ce(L)=1.0 *3*; ce(M)=0.17 *8* α(K)exp=0.0024 *8*; α(L)exp=0.00024 *8*; α(M)exp=0.00004 *2* α=0.0032 *6*; α(K)=0.0027 *5*; α(L)=0.00035 *5*; α(M)=7.2×10^{-5} *11*; α(N+..)=1.8×10^{-5} *3* α(N)=1.56×10^{-5} *23*; α(O)=2.4×10^{-6} *4*; α(P)=1.7×10^{-7} *4*
848.4@b *3*	0.34@ *7*	1706.94	3/2,5/2$^+$	858.499	3/2$^+$			
850.43 *10*	0.97 *11*	862.80	(7/2)$^+$	12.326	3/2$^+$	E2	0.0031 *6*	ce(K)=1.0 *3*; α(K)exp=0.005 *2* (1966Ha23) α=0.0031 *6*; α(K)=0.0027 *5*; α(L)=0.00035 *5*; α(M)=7.1×10^{-5} *10*; α(N+..)=1.8×10^{-5} *3* α(N)=1.54×10^{-5} *22*; α(O)=2.4×10^{-6} *4*; α(P)=1.7×10^{-7} *4*
858.496 *15*	15.4 *5*	858.499	3/2$^+$	0.0	1/2$^+$	M1,E2	0.0031 *6*	ce(K)=9.0 *4*; ce(L)=0.87 *15*; ce(M)=0.32 *11* α(K)exp=0.0026 *2*; α(L)exp=0.00026 *5*; α(M)exp=0.00009 *3* α=0.0031 *6*; α(K)=0.0026 *5*; α(L)=0.00034 *5*; α(M)=7.0×10^{-5} *10*; α(N+..)=1.8×10^{-5} *3* α(N)=1.51×10^{-5} *22*; α(O)=2.3×10^{-6} *4*; α(P)=1.7×10^{-7} *4*
874.83 *3*	1.66 *8*	887.134	5/2$^+$	12.326	3/2$^+$	M1,E2	0.0029 *5*	ce(K)=0.69 *10*; ce(L)=0.14 *4*; α(K)exp=0.0019 *3*; α(L)exp=0.00038 *11* α=0.0029 *5*; α(K)=0.0025 *5*; α(L)=0.00032 *5*; α(M)=6.7×10^{-5} *10*; α(N+..)=1.67×10^{-5} *25* α(N)=1.44×10^{-5} *21*; α(O)=2.2×10^{-6} *4*; α(P)=1.6×10^{-7} *3*
887.164 *24*	0.88 *4*	887.134	5/2$^+$	0.0	1/2$^+$			
x892.29 *22*	0.14 *6*							
x899.38 *5*	0.30 *2*							
909.27 *8*	0.38 *2*	1211.792	3/2$^+$,5/2$^+$	302.395	3/2$^+$	M1	0.00311 *5*	ce(K)=0.21 *4*; α(K)exp=0.0025 *5* α=0.00311 *5*; α(K)=0.00269 *4*; α(L)=0.000339 *5*; α(M)=6.95×10^{-5} *10*; α(N+..)=1.749×10^{-5} *25* α(N)=1.501×10^{-5} *21*; α(O)=2.31×10^{-6} *4*; α(P)=1.724×10^{-7} *25*
911.647 *13*	3.88 *16*	923.955	5/2$^+$	12.326	3/2$^+$	M1,E2	0.0027 *5*	ce(K)=1.9 *4*; α(K)exp=0.0022 *5*

$^{133}_{56}Ba_{77}$-9

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ (continued)

γ(^{133}Ba) (continued)

E_γ ‡	I_γ ‡&	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	α†	Comments
								α=0.0027 *5*; α(K)=0.0023 *4*; α(L)=0.00029 *5*; α(M)=6.1×10^{-5} *9*; α(N+..)=1.52×10^{-5} *22* α(N)=1.30×10^{-5} *19*; α(O)=2.0×10^{-6} *3*; α(P)=1.4×10^{-7} *3*
920.623 *24*	0.77 *4*	1211.792	3/2$^+$,5/2$^+$	291.186	5/2$^+$	M1	0.00302 *5*	ce(K)=0.51 *10*; α(K)exp=0.0029 *6* α=0.00302 *5*; α(K)=0.00261 *4*; α(L)=0.000329 *5*; α(M)=6.75×10^{-5} *10*; α(N+..)=1.699×10^{-5} *24* α(N)=1.458×10^{-5} *21*; α(O)=2.24×10^{-6} *4*; α(P)=1.675×10^{-7} *24*
923.9@ *2*	0.90@ *5*	923.955	5/2$^+$	0.0	1/2$^+$			
932.98 *7*	0.51 *4*	1563.399	5/2$^+$	630.567	5/2$^+$	M1	0.00293 *5*	ce(K)=0.34 *9*; α(K)exp=0.0030 *8* α=0.00293 *5*; α(K)=0.00253 *4*; α(L)=0.000319 *5*; α(M)=6.54×10^{-5} *10*; α(N+..)=1.646×10^{-5} *23* α(N)=1.413×10^{-5} *20*; α(O)=2.17×10^{-6} *3*; α(P)=1.623×10^{-7} *23*
x981.06 *8*	0.23 *2*							E_γ: poor fit: the level energy difference is equal to 932.831 *25*.
x992.99 *9*	0.25 *2*							
1009.31 *4*	2.80 *13*	1021.584	3/2$^+$	12.326	3/2$^+$	M1	0.00244 *4*	ce(K)=1.28 *13*; ce(L)=0.16 *4*; α(K)exp=0.0021 *2*; α(L)exp=0.00026 *7* α=0.00244 *4*; α(K)=0.00211 *3*; α(L)=0.000265 *4*; α(M)=5.44×10^{-5} *8*; α(N+..)=1.369×10^{-5} *20* α(N)=1.175×10^{-5} *17*; α(O)=1.81×10^{-6} *3*; α(P)=1.352×10^{-7} *19*
1021.62 *5*	0.215 *15*	1021.584	3/2$^+$	0.0	1/2$^+$			
1038.18 *5*	0.27 *2*	1329.316	5/2$^+$	291.186	5/2$^+$	M1	0.00229 *4*	ce(K)=0.15 *4*; α(K)exp=0.0025 *7* α=0.00229 *4*; α(K)=0.00198 *3*; α(L)=0.000248 *4*; α(M)=5.09×10^{-5} *8*; α(N+..)=1.282×10^{-5} *18* α(N)=1.100×10^{-5} *16*; α(O)=1.693×10^{-6} *24*; α(P)=1.266×10^{-7} *18*
1043.02 *4*	0.33 *3*	1620.56	5/2$^+$	577.553	7/2$^+$	M1	0.00227 *4*	ce(K)=0.16 *4*; α(K)exp=0.0022 *6* α=0.00227 *4*; α(K)=0.00196 *3*; α(L)=0.000246 *4*; α(M)=5.04×10^{-5} *7*; α(N+..)=1.268×10^{-5} *18* α(N)=1.088×10^{-5} *16*; α(O)=1.674×10^{-6} *24*; α(P)=1.253×10^{-7} *18*
1061.56 *22*	3.38 *23*	1352.76	7/2$^+$	291.186	5/2$^+$	M1+E2	0.0019 *3*	ce(K)=1.09 *10*; ce(L)=0.22 *4*; α(K)exp=0.0015 *2*; α(L)exp=0.00029 *6* α=0.0019 *3*; α(K)=0.0016 *3*; α(L)=0.00021 *3*; α(M)=4.2×10^{-5} *6*; α(N+..)=1.07×10^{-5} *16* α(N)=9.2×10^{-6} *13*; α(O)=1.40×10^{-6} *21*; α(P)=1.03×10^{-7} *18*
1080.9@ *4*	0.13@ *2*	1620.56	5/2$^+$	539.800	1/2$^+$			E_γ: 1081.04 *11* in 1980VyZZ.
1099.99 *2*	7.7 *4*	1112.344	3/2$^+$,5/2$^+$,7/2$^+$	12.326	3/2$^+$	E2	0.001477 *21*	ce(K)=2.4 *2*; ce(L)=0.26 *3*; ce(M)=0.11 *3* α(K)exp=0.0014 *2*; α(L)exp=0.00015 *2*; α(M)exp=0.00006 *2* α=0.001477 *21*; α(K)=0.001270 *18*; α(L)=0.0001646 *23*; α(M)=3.38×10^{-5} *5*; α(N+..)=8.5×10^{-6} *4* α(N)=7.28×10^{-6} *11*; α(O)=1.109×10^{-6} *16*; α(P)=7.89×10^{-8} *11*
1111.9@ *4*	0.09@ *4*	1112.344	3/2$^+$,5/2$^+$,7/2$^+$	0.0	1/2$^+$			E_γ: this transition questionably populates the g.s. in 1976He11, the level energy difference = 1112.344 *12*.

$^{133}_{56}Ba_{77}$-10

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ (continued)

γ(^{133}Ba) (continued)

E_γ[‡]	I_γ[‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[†]	Comments
1111.9[@] *4*	0.09[@] *4*	1689.74	3/2$^+$,5/2,7/2$^+$	577.553	7/2$^+$			E_γ: this transition questionably populates the 577.553-keV level (1976He11), the level energy difference = 1112.19 *6*.
[x]1175.98 *7*	0.19 *2*							
[x]1181.99 *13*	0.046 *13*							
[x]1192.3[@] *3*	0.006[@] *3*							
1199.447 *22*	0.83 *6*	1211.792	3/2$^+$,5/2$^+$	12.326	3/2$^+$	M1	0.001653 *24*	ce(K)=0.28 *3*; α(K)exp=0.0015 *2* α=0.001653 *24*; α(K)=0.001423 *20*; α(L)=0.0001780 *25*; α(M)=3.65×10^{-5} *6*; α(N+..)=1.517×10^{-5} α(N)=7.88×10^{-6} *11*; α(O)=1.213×10^{-6} *17*; α(P)=9.09×10^{-8} *13*; α(IPF)=5.99×10^{-6} *9*
1211.760 *25*	1.76 *12*	1211.792	3/2$^+$,5/2$^+$	0.0	1/2$^+$	M1,E2	0.00142 *21*	ce(K)=0.9 *3*; α(K)exp=0.0022 *7* (1966Ha23) α=0.00142 *21*; α(K)=0.00122 *18*; α(L)=0.000154 *21*; α(M)=3.2×10^{-5} *5*; α(N+..)=1.55×10^{-5} *10* α(N)=6.8×10^{-6} *9*; α(O)=1.04×10^{-6} *15*; α(P)=7.7×10^{-8} *13*; α(IPF)=7.58×10^{-6} *19*
[x]1219.2 *3*	0.09 *2*							
1230.06 *9*	0.16 *2*	1532.40	3/2,5/2,7/2$^+$	302.395	3/2$^+$			
1241.04 *15*	0.092 *16*	1532.40	3/2,5/2,7/2$^+$	291.186	5/2$^+$			
1261.01 *3*	0.98 *7*	1563.399	5/2$^+$	302.395	3/2$^+$			
1283.952 *24*	2.55 *17*	1283.959	3/2$^-$	0.0	1/2$^+$	(E1)	0.000555 *8*	α=0.000555 *8*; α(K)=0.000419 *6*; α(L)=5.10×10^{-5} *8*; α(M)=1.041×10^{-5} *15*; α(N+..)=7.49×10^{-5} *11* α(N)=2.24×10^{-6} *4*; α(O)=3.44×10^{-7} *5*; α(P)=2.56×10^{-8} *4*; α(IPF)=7.22×10^{-5} *11* Mult.: this transition populates the 1/2$^+$, g.s.; in ^{132}Ba(pol d,p) L=1 for the 1283.9-keV state. Comparison of Iγ and ce for 1283.9- and 1199.5-keV (M1) transitions point at mult.=(E1) for the former.
1317.24[b] *5*	0.92 *7*	1329.316	5/2$^+$	12.326	3/2$^+$			E_γ: poor fit: the level energy difference is equal to 1316.973 *17*.
1329.33[a] *5*	0.34 *3*	1329.316	5/2$^+$	0.0	1/2$^+$			E_γ: other transition questionably populates the 291.186-keV level from the 1620.56-keV level (1976He11).
1329.33[a] *5*	0.34 *3*	1620.56	5/2$^+$	291.186	5/2$^+$			E_γ: questionable population in 1976He11, the level energy difference = 1329.38 *4*; other transition populates the g.s. from the 1329.3-keV level.
1340.2[@] *3*	0.18[@] *3*	1352.76	7/2$^+$	12.326	3/2$^+$			
1387.41 *7*	0.136 *15*	1689.74	3/2$^+$,5/2,7/2$^+$	302.395	3/2$^+$			
1398.49 *8*	0.19 *2*	1689.74	3/2$^+$,5/2,7/2$^+$	291.186	5/2$^+$			
1404.7[@] *4*	0.117[@] *17*	1706.94	3/2,5/2$^+$	302.395	3/2$^+$			
1415.9[@] *3*	0.158[@] *18*	1706.94	3/2,5/2$^+$	291.186	5/2$^+$			
1467.28 *13*	0.074 *10*	1769.70	3/2,5/2$^+$	302.395	3/2$^+$			
1478.72 *9*	0.069 *7*	1769.70	3/2,5/2$^+$	291.186	5/2$^+$			E_γ: poor fit: the level energy difference is equal to 1478.51 *5*.
1516.34 *20*	0.07 *2*	1528.64	3/2,5/2$^+$	12.326	3/2$^+$			

$^{133}_{56}Ba_{77}$-11

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ (continued)

$\gamma(^{133}Ba)$ (continued)

E_γ ‡	I_γ ‡&	E_i(level)	J_i^π	E_f	J_f^π	Comments
1528.62 *10*	0.15 *2*	1528.64	3/2,5/2$^+$	0.0	1/2$^+$	
x1540.01 *20*	0.06 *1*					
1550.97 *5*	0.41 *3*	1563.399	5/2$^+$	12.326	3/2$^+$	
1563.36 *6*	0.36 *3*	1563.399	5/2$^+$	0.0	1/2$^+$	
x1581.66 *12*	0.12 *2*					
x1592.33 *13*	0.030 *8*					
x1595.6@b *5*	0.3@ *2*					
1608.35@ *13*	1.67@ *11*	1620.56	5/2$^+$	12.326	3/2$^+$	E_γ: the level energy difference is equal to 1608.24 *4*; 1608.09 *3* in 1980VyZZ.
1620.9@ *7*	0.05@ *2*	1620.56	5/2$^+$	0.0	1/2$^+$	
x1659.6@ *5*	0.05@ *2*					
1677.3@ *3*	0.19@ *3*	1689.74	3/2$^+$,5/2,7/2$^+$	12.326	3/2$^+$	E_γ: 1677.01 *9* in 1980VyZZ.
1694.4@ *4*	0.178@ *16*	1706.94	3/2,5/2$^+$	12.326	3/2$^+$	
1706.7@ *4*	0.038@ *10*	1706.94	3/2,5/2$^+$	0.0	1/2$^+$	
x1720.2@ *2*	0.03@ *2*					
1757.06 *20*	0.063 *10*	1769.70	3/2,5/2$^+$	12.326	3/2$^+$	
1769.60 *7*	0.25 *2*	1769.70	3/2,5/2$^+$	0.0	1/2$^+$	
x1782.9@ *5*	0.05@ *3*					
x1805.83 *10*	0.055 *6*					
1818.1@ *4*	0.05@ *1*	1830.22	3/2,5/2$^+$	12.326	3/2$^+$	
1830.21@ *3*	0.06@ *2*	1830.22	3/2,5/2$^+$	0.0	1/2$^+$	
x1851.7@b *6*	0.02@ *1*					
x1886.7@b *4*	0.03@ *1*					

† Additional information 1.
‡ From 1980VyZZ, except as noted. Since some of the quoted uncertainties are unrealistically small, the evaluators added 3% in quadrature to the uncertainties of 1980VyZZ. There are systematic discrepancies between Iγ values measured by 1976He11 and 1980VyZZ.
# From α(K)exp, α(L)exp and α(M)exp. Ice are from 1983JoZX, except as noted; α(exp)=Ice/Iγ for 302.35γ (mult.=M1 in 1983JoZX, 1976He11) is normalized to α(K)=0.0408 by evaluators.
@ From 1976He11.
& For absolute intensity per 100 decays, multiply by 0.0244 *10*.
a Multiply placed.
b Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

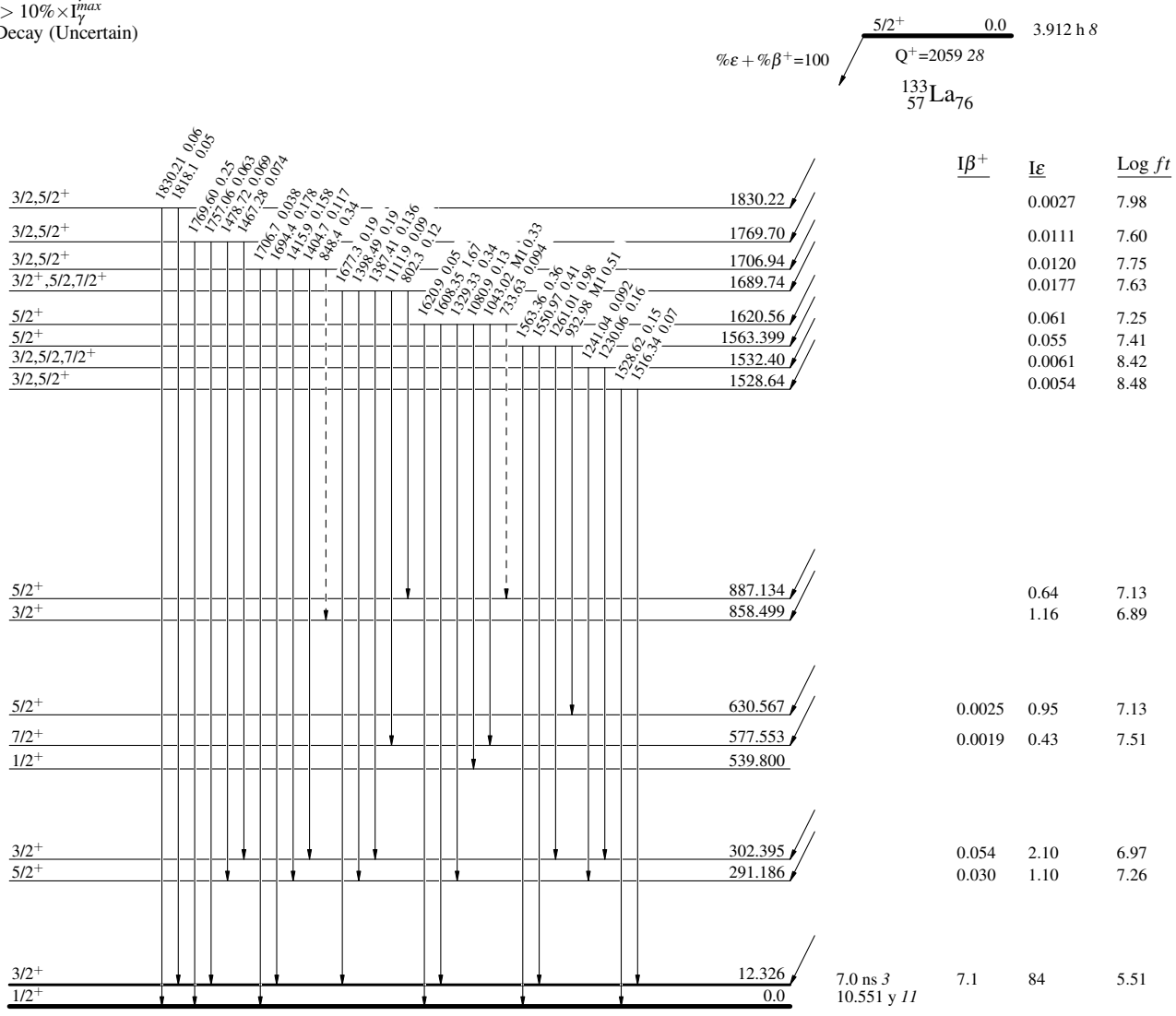
$^{133}_{56}Ba_{77}$-12

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ

Decay Scheme

Intensities: Relative I_γ

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



	Iβ+	Iε	Log *ft*
		0.0027	7.98
		0.0111	7.60
		0.0120	7.75
		0.0177	7.63
		0.061	7.25
		0.055	7.41
		0.0061	8.42
		0.0054	8.48
		0.64	7.13
		1.16	6.89
	0.0025	0.95	7.13
	0.0019	0.43	7.51
	0.054	2.10	6.97
	0.030	1.10	7.26
	7.1	84	5.51

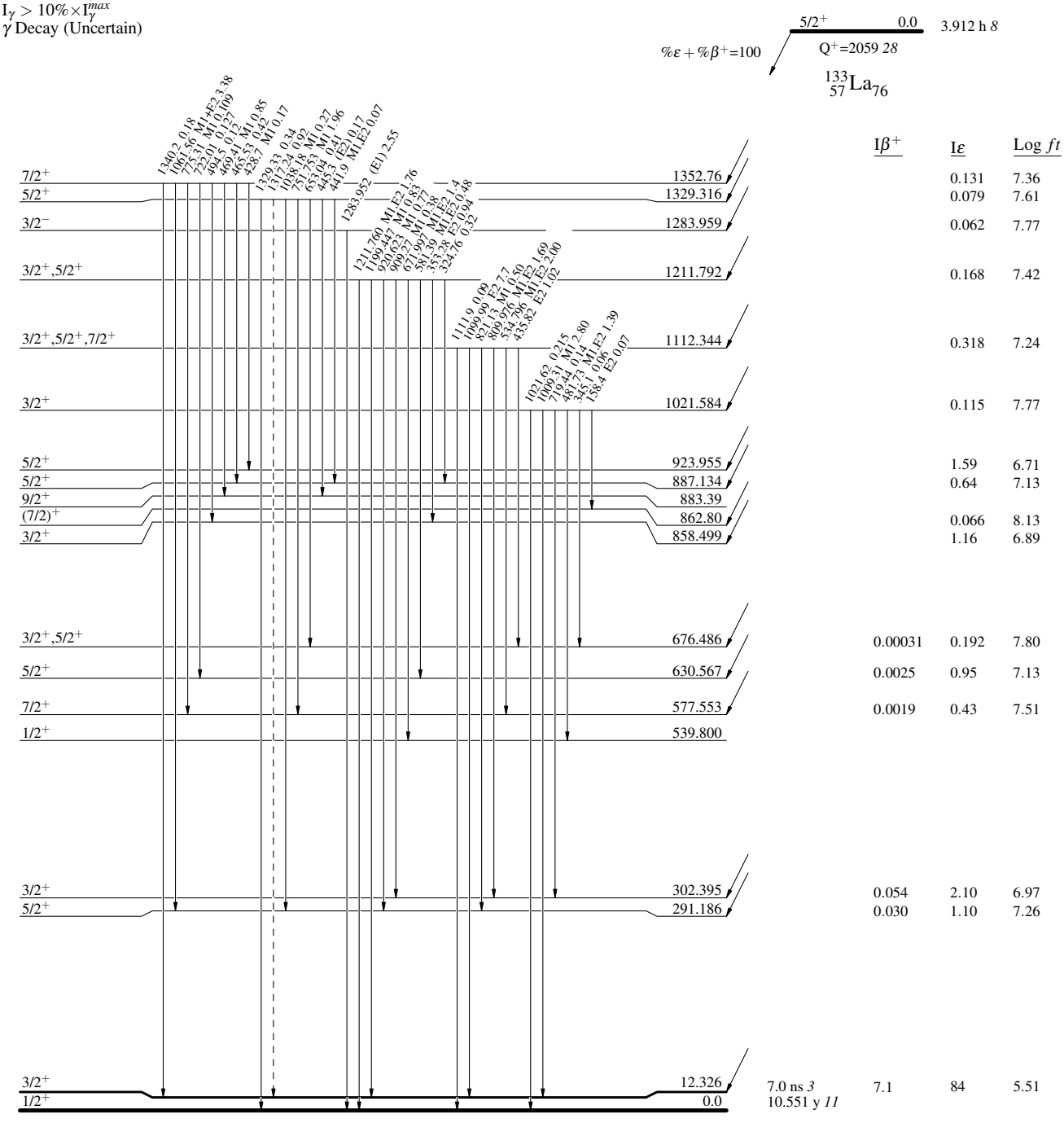
^{133}La ε decay (3.912 h) 1976He11,1980VyZZ

Decay Scheme (continued)

Intensities: Relative I_γ

Legend

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



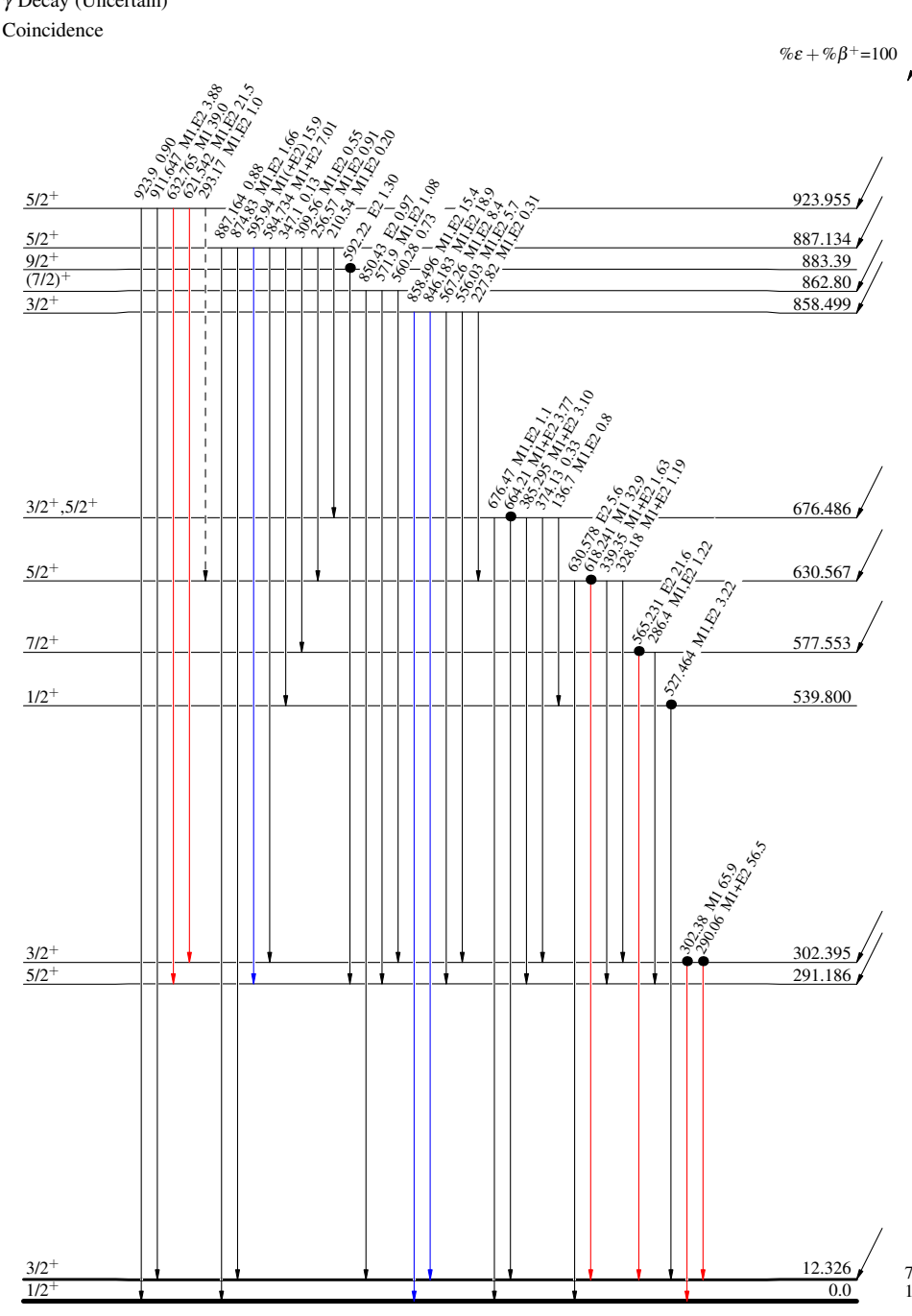
$^{133}_{56}Ba_{77}$

^{133}La ε decay (3.912 h) 1976He11,1980VyZZ

Decay Scheme (continued)

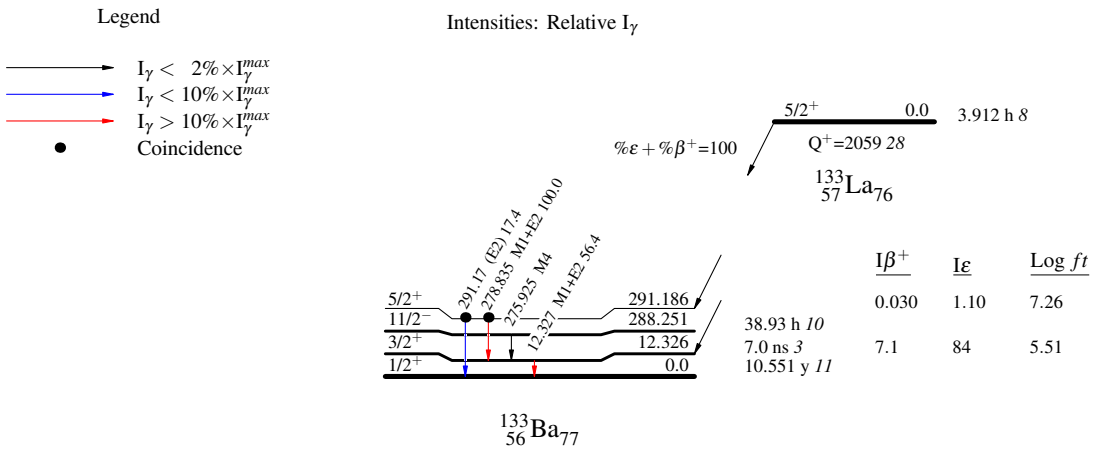
Intensities: Relative I_γ

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



^{133}La ε decay (3.912 h) 1976He11,1980VyZZ

Decay Scheme (continued)



^{124}Sn(^{12}C,3nγ) 1975Gi11,1995Ju02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov and A. Rodionov, F. G. Kondev	NDS 112, 855 (2011)	31-Oct-2010

1975Gi11: ^{124}Sn(^{12}C,3nγ), E=46 MeV; measured Eγ, Iγ, $\gamma\gamma$ coin, $\gamma\gamma$ delay, $\gamma(\theta)$; ^{133}Ba: deduced levels, J^π, $T_{1/2}$. Cyclotron, Ge(Li) detectors.
1995Ju02: ^{124}Sn(^{13}C,4nγ) E=48.4, 65.5 MeV; measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$ coin, DCO values; ^{133}Ba: deduced levels, J^π.

^{133}Ba Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	Comments
0.0	1/2$^+$	10.551 y *11*	
12.327 *6*	3/2$^+$		
288.4 *3*	11/2$^-$	38.93 h *10*	
290.96 *21*	5/2$^+$		
302.96 *22*	3/2$^+$		E(level): not suggested in 1995Ju02.
577.0 *4*	7/2$^+$		
901.9 *6*	13/2$^-$		
968.9 *7*	15/2$^-$		
1528.9 *8*	15/2$^-$		
1711.9 *7*	17/2$^-$		
1857.9 *7*	19/2$^-$		
1941.4 *7*	19/2$^+$	3.5 ns *15*	$T_{1/2}$: authors of 1975Gi11 give 2 to 5 ns. J$^\pi$: assigned by analogy with ^{135}Ce, ^{137}Nd, and ^{131}Xe in 1975Gi11.
2170.3 *8*	19/2$^-$		
2365.1 *8*	23/2$^+$		
2381.2 *8*	21/2$^+$		
2457.4? *9*	21/2$^-$		E(level): not observed in 1995Ju02.
2490.2? *9*			E(level): not observed in 1995Ju02.
2495.3?[@] *10*	21/2$^+$[@]		
2508.7[@] *9*	21/2$^-$[@]		
2829.8[@] *9*	23/2$^-$[@]		
2888.3[@] *12*	23/2$^-$[@]		
2977.1[@] *11*	19/2[@]		
3104.0?[@] *11*	25/2$^+$[@]		
3113.8[@] *11*	21/2$^+$[@]		
3245.7[@] *11*	23/2$^+$[@]		
3254.2[@] *11*	25/2$^-$[@]		
3344.3?[@] *13*	27/2$^+$[@]		
3581.0?[@] *12*	27/2$^-$[@]		

[†] From a least-squares fit to Eγ's.
[‡] From 1975Gi11.
[#] From 'Adopted Levels'.
[@] Added by evaluators using unplaced γ's from 1975Gi11 and using the ^{133}Ba level scheme suggested by 1995Ju02.

^{124}Sn(^{12}C,3nγ) 1975Gi11,1995Ju02 (continued)

$\gamma(^{133}Ba)$

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	Comments
12.327 *6*		12.327	3/2$^+$	0.0	1/2$^+$	M1+E2	E_γ,Mult.: from 'Adopted Levels and gammas'.
83.5 *1*	30 *3*	1941.4	19/2$^+$	1857.9	19/2$^-$	(E1)	I_γ: from $\gamma\gamma$-coin. Mult.: stated in table 1 of 1975Gi11.
[x]110.7 *1*	3.3 *3*						
[x]120.5 *1*	1.0 *1*						
131.90 *13*	3.6 *4*	3245.7	23/2$^+$	3113.8	21/2$^+$		
[x]134.6 *1*	3.7 *4*						
136.70 *14*	4.5 *5*	3113.8	21/2$^+$	2977.1	19/2		
146.1 *1*		1857.9	19/2$^-$	1711.9	17/2$^-$		E_γ: given in level scheme only, not given in table 1 (1975Gi11).
[x]202.5 *2*	1.9 *2*						
229.2 *2*	3.5 *4*	1941.4	19/2$^+$	1711.9	17/2$^-$	E1	Mult.: stated in table 1 of 1975Gi11.
[x]255.9 *2*	6.4 *6*						
276.1 *3*		288.4	11/2$^-$	12.327	3/2$^+$	M4	Mult.: from 'Adopted Levels and gammas'.
278.8 *3*	11.5 *12*	290.96	5/2$^+$	12.327	3/2$^+$	M1(+E2)	$\gamma(\theta)$: A_2=−0.44 *6*.
285.8 *3*	6.2 *6*	577.0	7/2$^+$	290.96	5/2$^+$	M1(+E2)	$\gamma(\theta)$: A_2=−0.55 *13*.
290.6[@] *3*	3.3[@]	290.96	5/2$^+$	0.0	1/2$^+$		E_γ: 291.3 *1*, Iγ=0.4 *1* in 1995Ju02.
290.6[@] *3*	3.3[@]	302.96	3/2$^+$	12.327	3/2$^+$		$\gamma(\theta)$: A_2=−0.10 *15*.
303.0 *3*	6.4 *6*	302.96	3/2$^+$	0.0	1/2$^+$	M1(+E2)	$\gamma(\theta)$: A_2=−0.52 *8*. E_γ: not observed in 1995Ju02.
321.1 *3*	2.8 *3*	2829.8	23/2$^-$	2508.7	21/2$^-$		
326.8 *3*	2.1 *2*	3581.0?	27/2$^-$	3254.2	25/2$^-$		
[x]331.9 *3*	5.9 *6*						
338.4 *3*	2.5 *3*	2508.7	21/2$^-$	2170.3	19/2$^-$		
365.9 *4*	4.9 *5*	3254.2	25/2$^-$	2888.3	23/2$^-$		
[x]391.9 *4*	3.2 *3*						
[x]395.7 *4*	4.7 *5*						
[x]419.5 *4*	3.1 *3*						
423.7 *4*	25 *3*	2365.1	23/2$^+$	1941.4	19/2$^+$	E2	$\gamma(\theta)$: A_2=0.16 *4*.
439.8 *4*	10.2 *10*	2381.2	21/2$^+$	1941.4	19/2$^+$	M1+E2	$\gamma(\theta)$: A_2=−0.31 *12*.
458.1 *5*	4.5 *5*	2170.3	19/2$^-$	1711.9	17/2$^-$		
[x]531.6 *5*	1.6 *2*						
553.9 *6*	5.9 *5*	2495.3?	21/2$^+$	1941.4	19/2$^+$		
565.4 *6*	10.7 *11*	577.0	7/2$^+$	12.327	3/2$^+$	E2	$\gamma(\theta)$: A_2=0.03 *10*.
599.5 *6*	9.4 *9*	2457.4?	21/2$^-$	1857.9	19/2$^-$		E_γ: not observed in 1995Ju02. I_γ: composite line.
613.6 *6*	30 *3*	901.9	13/2$^-$	288.4	11/2$^-$	D+Q	$\gamma(\theta)$: A_2=−0.63 *7*.
[x]622.0 *6*	4.1 *4*						
627.1 *6*	12.8 *13*	1528.9	15/2$^-$	901.9	13/2$^-$	M1+E2	$\gamma(\theta)$: A_2=−0.77 *7*.
632.5 *6*	3.0 *3*	2490.2?		1857.9	19/2$^-$	M1,E2	$\gamma(\theta)$: A_2=0.16 *12*.
641.8 *6*	7.0 *7*	2170.3	19/2$^-$	1528.9	15/2$^-$	Q	$\gamma(\theta)$: A_2=0.40 *9*.
680.4 *7*	100	968.9	15/2$^-$	288.4	11/2$^-$	Q	$\gamma(\theta)$: A_2=0.20 *3*.
737.0 *7*	9.8 *10*	3245.7	23/2$^+$	2508.7	21/2$^-$		
738.9 *7*	4.9 *5*	3104.0?	25/2$^+$	2365.1	23/2$^+$		
742.9 *7*	18.0 *18*	1711.9	17/2$^-$	968.9	15/2$^-$	M1+E2	$\gamma(\theta)$: A_2=−0.84 *13*.
745.5 *7*	4.1 *4*	2457.4?	21/2$^-$	1711.9	17/2$^-$	Q	$\gamma(\theta)$: A_2=0.43 *13*. E_γ: the transition depopulates the 3256-keV level in 1995Ju02.
745.5 *7*	4.1 *4*	3254.2	25/2$^-$	2508.7	21/2$^-$		
[x]760.8 *8*	2.5 *3*						
809.8 *8*	9.0 *9*	1711.9	17/2$^-$	901.9	13/2$^-$	E2	$\gamma(\theta)$: A_2=0.11 *8*.
[x]842.7 *8*	7.0 *7*						
888.9 *9*	60 *6*	1857.9	19/2$^-$	968.9	15/2$^-$	Q	$\gamma(\theta)$: A_2=0.19 *3*.
960.8 *10*	3.0 *3*	2490.2?		1528.9	15/2$^-$	M1,E2	$\gamma(\theta)$: A_2=0.31 *10*.
979.2 *10*	9.2 *10*	3344.3?	27/2$^+$	2365.1	23/2$^+$		

Continued on next page (footnotes at end of table)

^{124}Sn(^{12}C,3nγ) 1975Gi11,1995Ju02 (continued)

$\gamma(^{133}Ba)$ (continued)

† From 1975Gi11; $\Delta E\gamma$ assigned by evaluators according statement of authors that $\Delta E\gamma \approx 0.1\%$.
‡ From 1975Gi11, observed at 55° to the beam.
# From $\gamma(\theta)$ of 1975Gi11, except as noted.
@ Multiply placed with undivided intensity.
x γ ray not placed in level scheme.

^{124}Sn(^{12}C,3nγ) 1975Gi11,1995Ju02

Level Scheme

Intensities: Relative I_γ

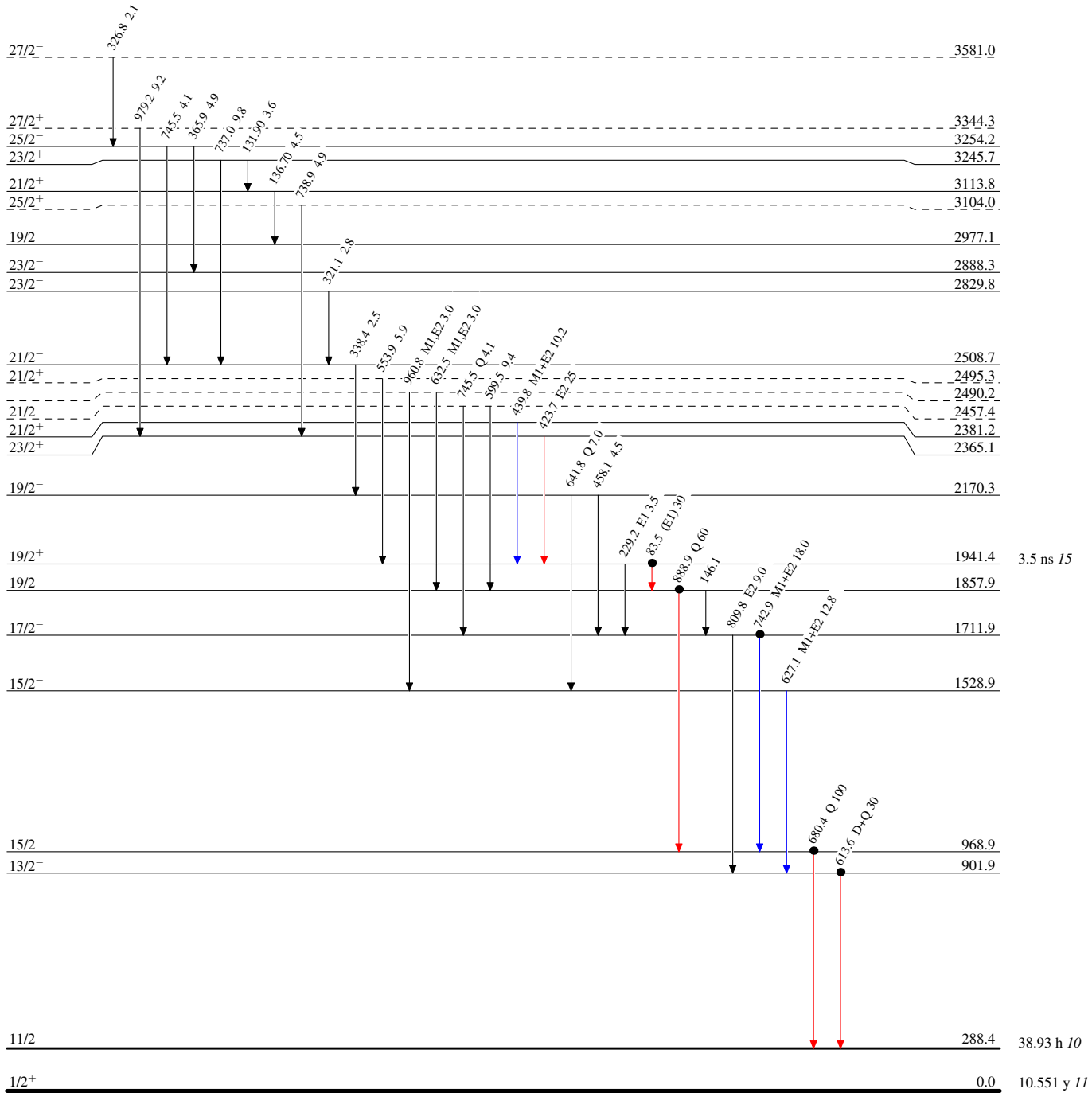
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

Coincidence



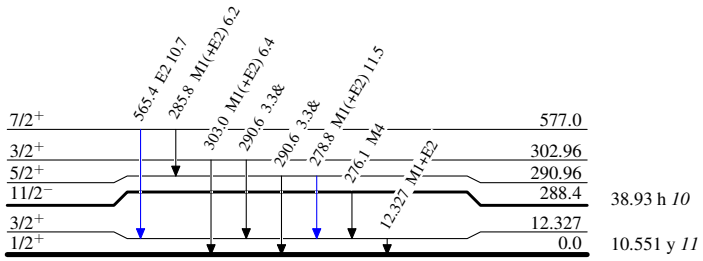
$^{133}_{56}Ba_{77}$

^{124}Sn(^{12}C,3nγ) 1975Gi11,1995Ju02

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



$^{133}_{56}Ba_{77}$

^{124}Sn(^{13}C,4nγ) 1995Ju02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov and A. Rodionov, F. G. Kondev	NDS 112, 855 (2011)	31-Oct-2010

1995Ju02: ^{124}Sn(^{13}C,4nγ) E=48.4, 65.5 MeV; measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$coin, DCO values; ^{133}Ba; deduced levels, J^{π}, rotational bands, B(M1)/B(E2). Tandem, NORDBALL array, cranked shell model.

^{133}Ba Levels

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	Comments
0.0[@]	1/2$^+$	10.551 y *11*	
12.327[&] *6*	3/2$^+$	7.0 ns *3*	
288.252[f] *10*	11/2$^-$	38.93 h *10*	
291.33[@] *6*	5/2$^+$		
577.77[&] *7*	7/2$^+$		
883.64[@] *8*	9/2$^+$		
901.83[g] *8*	13/2$^-$		
969.01[f] *8*	15/2$^-$		
1375.87[&] *9*	11/2$^+$		
1529.03[i] *9*	15/2$^-$		
1633.29[@] *10*	13/2$^+$		
1712.80[g] *9*	17/2$^-$		
1859.15[f] *9*	19/2$^-$		
1942.13[c] *10*	19/2$^+$	3.5 ns *15*	
2036.23 *11*	17/2$^-$		
2170.79[i] *9*	19/2$^-$		
2211.18[&] *11*	15/2$^+$		
2366.10[c] *11*	23/2$^+$		
2382.03[d] *14*	(21/2$^+$)		
2447.36[@] *11*	17/2$^+$		
2496.05 *12*	21/2$^+$		
2509.31[i] *9*	21/2$^-$		
2526.51 *11*	19/2$^-$		
2671.22[g] *11*	21/2$^-$		
2830.49[i] *10*	23/2$^-$		
2831.14[k] *12*	19/2$^{(+)}$		
2862.21 *11*	21/2$^+$		
2890.43[f] *10*	23/2$^-$		
2966.4 *4*	21/2$^-$		
2978.2 *5*	19/2		Populated by 137-keV D γ from 3115.24-keV level (J=21/2$^+$).
3062.99[k] *11*	21/2$^{(+)}$		
3103.86[d] *12*	25/2$^+$		
3115.24[a] *10*	21/2$^+$		
3246.58[b] *10*	23/2$^+$		
3255.97[i] *10*	25/2$^-$		
3346.00[c] *12*	27/2$^+$		
3373.65[k] *12*	23/2$^{(+)}$		
3433.77[a] *12*	25/2$^+$		
3545.97[i] *11*	27/2$^-$		
3582.74[h] *11*	27/2$^-$		
3646.47 *13*	25/2$^+$		

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^{124}Sn(^{13}C,4nγ) 1995Ju02 (continued)

^{133}Ba Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	Comments
3688.46[g] *14*	(25/2$^-$)	
3700.65[k] *16*	25/2$^{(+)}$	
3709.95 *16*	25/2	
3710.73[b] *12*	27/2$^+$	
3838.98[d] *14*	29/2$^+$	
3967.91 *15*		E(level): remains uncertain: populating (690.9γ *1*) and depopulating (1601.8γ *1*) transitions of the level fit poorly to corresponding level energy differences (normalized χ^2=6.26 for each transition).
3988.03[f] *15*	27/2$^-$	
4084.7[k] *4*	27/2$^{(+)}$	
4145.64 *14*	29/2$^{(+)}$	
4179.08[a] *13*	29/2$^+$	
4194.47[i] *13*	29/2$^-$	
4203.27[c] *14*	31/2$^+$	
4223.88 *13*	29/2$^+$	
4242.91[h] *12*	31/2$^-$	
4255.88 *13*	29/2$^+$	
4402.47 *16*	(27/2)	J$^{\pi}$: stretched D γ from 4657.87-keV, J=29/2$^-$ level.
4421.96[i] *12*	31/2$^-$	
4425.14 *13*	27/2	
4485.41 *13*	31/2$^+$	
4500.7[k] *7*	29/2	
4502.49[b] *13*	31/2$^+$	
4633.67 *18*	29/2	J$^{\pi}$: stretched D γ from 4824.57-keV, J=31/2$^-$ level.
4657.87[e] *12*	29/2$^-$	
4824.57[e] *16*	31/2$^-$	
4830.64[d] *14*	33/2$^+$	
5001.48[a] *15*	33/2$^+$	
5058.17[e] *19*	33/2$^-$	
5174.22 *15*	33/2$^+$	
5242.32[c] *15*	35/2$^+$	
5263.5[i] *6*	(33/2$^-$)	
5350.47[e] *21*	35/2$^-$	
5391.77[i] *13*	35/2$^-$	
5417.86[b] *14*	35/2$^+$	
5430.16[j] *14*	33/2$^-$	
5465.24 *18*	35/2$^+$	
5520.61[h] *15*	35/2$^-$	
5661.92[j] *14*	35/2$^-$	
5735.67[e] *23*	37/2$^-$	
5858.23[d] *16*	37/2$^+$	
5936.30[a] *16*	37/2$^+$	
5983.77[j] *14*	37/2$^-$	
6237.1[e] *3*	39/2$^-$	
6277.42[c] *17*	39/2$^+$	
6307.97[j] *15*	39/2$^-$	
6366.95[i] *14*	39/2$^-$	
6425.83[b] *16*	39/2$^+$	
6546.23 *19*		
6749.56[j] *16*	41/2$^-$	
6818.1[e] *3*	41/2$^-$	

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^{124}Sn(^{13}C,4nγ) 1995Ju02 (continued)

^{133}Ba Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
6955.14[a] *18*	(41/2$^+$)	7217.76[j] *19*	43/2$^-$	7431.44[b] *18*	(43/2$^+$)
6980.63[d] *19*	41/2$^+$	7421.1[e] *4*	43/2$^-$	7585.93[c] *19*	(43/2$^+$)
				8052.1[e] *5*	45/2$^-$

† From a least-squares fit to Eγ's.
‡ From deduced transition multipolarities and band assignment.
# From 'Adopted Levels'.
@ Band(A): based on 1/2$^+$ state, α=+1/2; Dominant $\nu(s_{1/2})^{-1}$ configuration.
& Band(B): based on 3/2$^+$ state, α=−1/2; Dominant $\nu(d_{3/2})^{-1}$ configuration.
[a] Band(C): Based on 21/2$^+$ state, α=+1/2; probable configuration=$\nu(h_{11/2})^{-1}\otimes\pi(h_{11/2}^{-1},g_{7/2}^{-1})$.
[b] Band(D): Based on 23/2$^+$ state, α=−1/2; probable configuration=$\nu(h_{11/2})^{-1}\otimes\pi(h_{11/2}^{-1},g_{7/2}^{-1})$.
[c] Band(E): Based on 19/2$^+$ state, α=−1/2; probable a mixture of $\nu(s_{1/2}^{-1},h_{11/2}^{-2})$ and $\nu(d_{3/2}^{-1},h_{11/2}^{-2})$ configurations.
[d] Band(F): Based on 21/2$^+$ state, α=+1/2; probable a mixture of $\nu(s_{1/2}^{-1},h_{11/2}^{-2})$ and $\nu(d_{3/2}^{-1},h_{11/2}^{-2})$ configurations.
[e] Band(G): based on 29/2$^-$ state.
[f] Band(H): Based on 11/2$^-$ state, α=−1/2; configuration=$\nu(h_{11/2})^{-1}$.
[g] Band(I): Based on 13/2$^-$ state, α=+1/2; configuration=$\nu(h_{11/2})^{-1}$.
[h] Band(J): based on 27/2$^-$ state.
[i] Band(K): based on 15/2$^-$ state.
[j] Band(L): band L based on 33/2$^-$ state.
[k] Band(M): Based on 19/2$^{(+)}$ state; probable configuration=$\nu(h_{11/2})^{-1}\otimes\pi(h_{11/2}^{-1},d_{5/2}^{-1})$.

γ(^{133}Ba)

E_γ†	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	Comments
12.327 *6*		12.327	3/2$^+$	0.0	1/2$^+$	M1+E2	E_γ,Mult.: not observed in 1995Ju02; from 'Adopted Levels and gammas'.
83.1 *1*	48 *5*	1942.13	19/2$^+$	1859.15	19/2$^-$	D	R=1.0 *1*.
131.4 *1*	3.0 *2*	3246.58	23/2$^+$	3115.24	21/2$^+$	D	R=0.78 *3*.
137.0 *5*	0.23 *4*	3115.24	21/2$^+$	2978.2	19/2	D	R=0.88 *7*.
146.4 *1*	0.64 *4*	1859.15	19/2$^-$	1712.80	17/2$^-$	D	R=0.87 *7*.
166.7 *1*	9.20 *8*	4824.57	31/2$^-$	4657.87	29/2$^-$	D	R=0.82 *2*.
187.2 *1*	7.9 *3*	3433.77	25/2$^+$	3246.58	23/2$^+$	D	R=0.80 *2*.
190.9 *1*	0.6 *1*	4824.57	31/2$^-$	4633.67	29/2	D	R=0.82 *8*.
219.2 *1*	0.24 *4*	2890.43	23/2$^-$	2671.22	21/2$^-$	M1+E2	R=0.47 *7*.
227.4 *1*	1.31 *8*	4421.96	31/2$^-$	4194.47	29/2$^-$	D	R=0.93*14*.
229.2 *1*	5.26 *9*	1942.13	19/2$^+$	1712.80	17/2$^-$	D	R=0.93 *3*.
231.7 *1*	0.6 *2*	5661.92	35/2$^-$	5430.16	33/2$^-$		
231.9 *1*	0.30 *4*	3062.99	21/2$^{(+)}$	2831.14	19/2$^{(+)}$	D	R=0.78 *5*.
232.7 *1*	0.9 *2*	4657.87	29/2$^-$	4425.14	27/2		
233.6 *1*	13.3 *5*	5058.17	33/2$^-$	4824.57	31/2$^-$	D	R=0.83 *2*.
243.7 *1*	0.44 *4*	5417.86	35/2$^+$	5174.22	33/2$^+$	D	R=0.79 *9*.
246.6 *1*	1.00 *5*	4502.49	31/2$^+$	4255.88	29/2$^+$	D	R=0.79 *7*.
252.9 *1*	0.41 *6*	3115.24	21/2$^+$	2862.21	21/2$^+$	D	R=1.76 *13*, ΔJ=0.
255.4 *1*	1.07 *6*	4657.87	29/2$^-$	4402.47	(27/2)	D	R=0.81 *6*.
257.5 *1*	<0.2	1633.29	13/2$^+$	1375.87	11/2$^+$	M1+E2	R=0.52 *8*.
261.4 *1*	0.8 *1*	4485.41	31/2$^+$	4223.88	29/2$^+$	D	R=0.63 *7*.
275.925 *7*		288.252	11/2$^-$	12.327	3/2$^+$	M4	E_γ,Mult.: from 'Adopted Levels and gammas'.
276.9 *1*	6.1 *2*	3710.73	27/2$^+$	3433.77	25/2$^+$	D	R=0.80 *2*.

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^{124}Sn(^{13}C,4nγ) 1995Ju02 (continued)

γ(^{133}Ba) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
279.1 *1*	1.9 *3*	291.33	5/2$^+$	12.327	3/2$^+$	M1(+E2)	Mult.: from 'Adopted Levels and gammas'. R=0.71 *3*.
282.2 *1*	0.9 *1*	4485.41	31/2$^+$	4203.27	31/2$^+$	D	R=1.34 *10*, ΔJ=0.
286.4 *1*	<0.1	577.77	7/2$^+$	291.33	5/2$^+$	M1,E2	Mult.: from 'Adopted Levels and gammas'. R=1.2 *2*.
290.0 *1*	7.6 *2*	3545.97	27/2$^-$	3255.97	25/2$^-$	D	R=0.76 *2*.
291.3 *1*	0.4 *1*	291.33	5/2$^+$	0.0	1/2$^+$	E2	Mult.: in ^{133}La ε decay mult.=(E2). R=1.43 *7*.
292.3 *1*	10.8 *4*	5350.47	35/2$^-$	5058.17	33/2$^-$	D	R=0.77 *2*.
305.9 *1*	0.22 *5*	883.64	9/2$^+$	577.77	7/2$^+$	D	R=0.68 *4*.
306.4 *1*	0.3 *1*	4485.41	31/2$^+$	4179.08	29/2$^+$		
310.8 *1*	1.9 *3*	3373.65	23/2$^{(+)}$	3062.99	21/2$^{(+)}$		
311.4 *1*	0.7 *2*	2170.79	19/2$^-$	1859.15	19/2$^-$		
321.3 *1*	11.1 *5*	2830.49	23/2$^-$	2509.31	21/2$^-$	D	R=0.74 *3*.
321.8 *1*	1.9 *3*	5983.77	37/2$^-$	5661.92	35/2$^-$		
323.5 *1*	0.9 *1*	4502.49	31/2$^+$	4179.08	29/2$^+$	D	R=0.78 *4*.
324.3 *1*	1.3 *2*	6307.97	39/2$^-$	5983.77	37/2$^-$	D	R=0.56 *5*.
326.8 *1*	8.6 *4*	3582.74	27/2$^-$	3255.97	25/2$^-$	D	R=0.74 *2*.
327.0 *1*	1.0 *2*	3700.65	25/2$^{(+)}$	3373.65	23/2$^{(+)}$	D	R=0.89 *4*.
336.3 *1*	0.20 *5*	3709.95	25/2	3373.65	23/2$^{(+)}$	D	R=0.75 *10*.
338.6 *1*	16.7 *6*	2509.31	21/2$^-$	2170.79	19/2$^-$	D	R=0.70 *2*.
345.3 *1*	0.5 *2*	4830.64	33/2$^+$	4485.41	31/2$^+$	D	R=0.86 *9*.
365.5 *1*	5.3 *3*	3255.97	25/2$^-$	2890.43	23/2$^-$	D	R=0.71 *3*.
381.0 *5*	1.6 *2*	2890.43	23/2$^-$	2509.31	21/2$^-$		
382.5 *1*	1.2 *3*	6749.56	41/2$^-$	6366.95	39/2$^-$	D	R=0.65 *7*.
383.1 *1*	0.8 *2*	6366.95	39/2$^-$	5983.77	37/2$^-$		
384.0 *5*	0.35 *7*	4084.7	27/2$^{(+)}$	3700.65	25/2$^{(+)}$	D	R=0.81 *11*.
384.5 *1*	<0.3	3246.58	23/2$^+$	2862.21	21/2$^+$	D	R=0.77 *7*.
385.2 *1*	7.0 *3*	5735.67	37/2$^-$	5350.47	35/2$^-$	D	R=0.75 *2*.
411.6 *1*	0.7 *1*	5242.32	35/2$^+$	4830.64	33/2$^+$	D	R=0.80 *9*.
415.9[@] *1*	0.5 *1*	5417.86	35/2$^+$	5001.48	33/2$^+$	D	E_γ: poor fit; level energy difference is equal to 416.38 *10*. R=0.75 *6*.
416.0 *5*	<0.2	3246.58	23/2$^+$	2830.49	23/2$^-$		
416.0 *5*	<0.3	4500.7	29/2	4084.7	27/2$^{(+)}$		
419.2 *1*	0.67 *5*	6277.42	39/2$^+$	5858.23	37/2$^+$	D	R=0.62 *8*.
423.9 *1*	35.2 *10*	2366.10	23/2$^+$	1942.13	19/2$^+$	E2	R=1.49 *3*.
425.5 *1*	5.8 *2*	3255.97	25/2$^-$	2830.49	23/2$^-$	M1+E2	R=0.50 *6*.
439.9 *1*	0.40 *10*	2382.03	(21/2$^+$)	1942.13	19/2$^+$		
440.0 *5*	<0.2	2966.4	21/2$^-$	2526.51	19/2$^-$		
441.7 *1*	1.7 *2*	6749.56	41/2$^-$	6307.97	39/2$^-$	D	R=0.63 *7*.
458.0 *1*	10.5 *4*	2170.79	19/2$^-$	1712.80	17/2$^-$	D	R=0.60 *2*.
463.1 *1*	1.2 *1*	5983.77	37/2$^-$	5520.61	35/2$^-$	D	R=0.67 *12*.
468.2 *1*	1.9 *3*	7217.76	43/2$^-$	6749.56	41/2$^-$	D	R=0.61 *7*.
468.4 *1*	2.6 *2*	4179.08	29/2$^+$	3710.73	27/2$^+$	D	R=0.85 *9*.
476.3 *1*	0.6 *2*	7431.44	(43/2$^+$)	6955.14	(41/2$^+$)		
489.4 *1*	0.4 *1*	6425.83	39/2$^+$	5936.30	37/2$^+$		
490.0 *5*	0.3 *1*	2526.51	19/2$^-$	2036.23	17/2$^-$		
492.4 *1*	0.15 *5*	1375.87	11/2$^+$	883.64	9/2$^+$	D	R=0.82 *13*.
493.1 *1*	0.9 *1*	3838.98	29/2$^+$	3346.00	27/2$^+$	D	R=0.85 *9*.
496.0 *5*	<0.4	2862.21	21/2$^+$	2366.10	23/2$^+$		
499.1 *1*	2.2 *2*	5001.48	33/2$^+$	4502.49	31/2$^+$	D	R=0.76 *9*.
501.4 *1*	4.2 *2*	6237.1	39/2$^-$	5735.67	37/2$^-$	D	R=0.65 *3*.
507.2 *1*	0.5 *1*	2036.23	17/2$^-$	1529.03	15/2$^-$	M1+E2	R=0.53 *5*.
513.1 *1*	1.0 *1*	4223.88	29/2$^+$	3710.73	27/2$^+$	D	R=0.72 *10*.

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^{124}Sn(^{13}C,4nγ) 1995Ju02 (continued)

γ(^{133}Ba) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
518.3 *1*	1.3 *1*	5936.30	37/2$^+$	5417.86	35/2$^+$	D	R=0.82 *10*.
529.3 *1*	0.7 *1*	6955.14	(41/2$^+$)	6425.83	39/2$^+$		
545.1 *1*	1.9 *1*	4255.88	29/2$^+$	3710.73	27/2$^+$	D	R=0.72 *5*.
554.0 *1*	2.9 *2*	2496.05	21/2$^+$	1942.13	19/2$^+$	M1+E2	R=0.46 *5*.
560.0 *1*	2.6 *1*	1529.03	15/2$^-$	969.01	15/2$^-$	D	R=1.02 *7*.
565.4 *1*	0.9 *1*	577.77	7/2$^+$	12.327	3/2$^+$	E2	Mult.: from 'Adopted Levels and gammas'. R=1.34 *4*.
577.9 *1*	<0.2	2211.18	15/2$^+$	1633.29	13/2$^+$	D	R=0.9 *2*.
581.0 *1*	2.2 *1*	6818.1	41/2$^-$	6237.1	39/2$^-$	D	R=0.62 *5*.
586.0 *5*	0.3 *1*	5417.86	35/2$^+$	4830.64	33/2$^+$		E_γ: poor fit; level energy difference is equal to 587.22 *10*.
592.1 *1*	1.3 *1*	5983.77	37/2$^-$	5391.77	35/2$^-$	D	R=0.65 *9*.
592.4 *1*	2.0 *1*	883.64	9/2$^+$	291.33	5/2$^+$	E2	R=1.27 *8*.
603.0 *5*	1.0 *1*	7421.1	43/2$^-$	6818.1	41/2$^-$	D	R=0.6 *2*.
613.6 *1*	19.0 *9*	901.83	13/2$^-$	288.252	11/2$^-$	M1+E2	R=0.44 *2*.
615.8 *1*	1.3 *2*	5858.23	37/2$^+$	5242.32	35/2$^+$	D	R=0.68 *10*.
627.3[#] *1*	11.3[#] *5*	1529.03	15/2$^-$	901.83	13/2$^-$	M1+E2	R=0.39 *1*.
627.3[#] *1*	3.6[#] *2*	4830.64	33/2$^+$	4203.27	31/2$^+$	D	R=0.51 *4*.
631.0 *5*	0.7 *1*	8052.1	45/2$^-$	7421.1	43/2$^-$	D	R=0.6 *1*.
634.6 *1*	1.4 *1*	5465.24	35/2$^+$	4830.64	33/2$^+$	M1+E2	R=0.55 *6*.
641.9 *1*	10.2 *5*	2170.79	19/2$^-$	1529.03	15/2$^-$	E2	R=1.51 *3*.
650.2 *1*	4.4 *2*	2509.31	21/2$^-$	1859.15	19/2$^-$	M1+E2	R=0.49 *3*.
655.4 *1*	0.7 *2*	3545.97	27/2$^-$	2890.43	23/2$^-$		
659.6 *1*	<1	2830.49	23/2$^-$	2170.79	19/2$^-$	E2	R=1.36 *8*.
660.1 *1*	9.0 *6*	4242.91	31/2$^-$	3582.74	27/2$^-$	E2	R=1.31 *12*.
667.9 *1*	0.9 *1*	3115.24	21/2$^+$	2447.36	17/2$^+$	E2	R=1.44 *8*.
680.7 *1*	100	969.01	15/2$^-$	288.252	11/2$^-$	E2	R=1.36 *2*.
688.0 *1*	0.6 *1*	6546.23		5858.23	37/2$^+$		
690.6[@] *1*	0.5 *2*	4657.87	29/2$^-$	3967.91			E_γ: see comment for 3967.91-keV level.
693.0 *5*	1.0 *3*	3582.74	27/2$^-$	2890.43	23/2$^-$		
697.0 *1*	6.4 *5*	4242.91	31/2$^-$	3545.97	27/2$^-$	E2	R=1.35 *7*.
702.3 *1*	0.5 *1*	3373.65	23/2$^{(+)}$	2671.22	21/2$^-$	D	R=0.9 *1*.
703.2 *1*	0.7 *2*	6980.63	41/2$^+$	6277.42	39/2$^+$		
711.0 *5*	<0.2	4084.7	27/2$^{(+)}$	3373.65	23/2$^{(+)}$		
715.6 *1*	7.6 *3*	3545.97	27/2$^-$	2830.49	23/2$^-$	E2	R=1.42 *8*.
735.0 *1*	0.4 *1*	3838.98	29/2$^+$	3103.86	25/2$^+$		
737.3 *1*	1.8 *1*	3246.58	23/2$^+$	2509.31	21/2$^-$	D	R=0.74 *5*.
737.8 *1*	4.0 *2*	3103.86	25/2$^+$	2366.10	23/2$^+$	M1+E2	R=0.36 *2*.
743.8 *1*	14.9 *5*	1712.80	17/2$^-$	969.01	15/2$^-$	M1+E2	R=0.48 *2*.
746.6 *1*	12.4 *4*	3255.97	25/2$^-$	2509.31	21/2$^-$	E2	R=1.45 *4*.
749.6 *1*	2.1 *2*	1633.29	13/2$^+$	883.64	9/2$^+$	E2	R=1.31 *5*.
750.6 *1*	0.8 *2*	3246.58	23/2$^+$	2496.05	21/2$^+$		
752.3 *1*	10.5 *3*	3582.74	27/2$^-$	2830.49	23/2$^-$	E2	R=1.45 *4*.
756.0 *5*	<0.3	4402.47	(27/2)	3646.47	25/2$^+$		
774.7 *1*	0.5 *1*	4485.41	31/2$^+$	3710.73	27/2$^+$	E2	R=1.22 *11*.
778.6 *1*	0.5 *1*	4425.14	27/2	3646.47	25/2$^+$	D	R=0.74 *7*.
791.7 *1*	1.4 *1*	4502.49	31/2$^+$	3710.73	27/2$^+$	E2	R=1.39 *8*.
796.5 *1*	1.5 *1*	2509.31	21/2$^-$	1712.80	17/2$^-$	E2	R=1.4 *2*.
798.0 *1*	0.8 *1*	1375.87	11/2$^+$	577.77	7/2$^+$	E2	R=1.26 *8*.
798.0 *5*	<0.3	3688.46	(25/2$^-$)	2890.43	23/2$^-$		
799.6 *1*	0.5 *2*	4145.64	29/2$^{(+)}$	3346.00	27/2$^+$		
810.9 *1*	6.5 *2*	1712.80	17/2$^-$	901.83	13/2$^-$	E2	R=1.33 *7*.
812.0 *5*	1.6 *3*	2671.22	21/2$^-$	1859.15	19/2$^-$	(M1+E2)	R=0.58 *6*.
813.8 *1*	0.5 *1*	2526.51	19/2$^-$	1712.80	17/2$^-$	M1+E2	R=0.48 *5*.
814.1 *1*	1.9 *1*	2447.36	17/2$^+$	1633.29	13/2$^+$	E2	R=1.32 *8*.

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^{124}Sn(^{13}C,4nγ) 1995Ju02 (continued)

γ(^{133}Ba) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
822.3 *1*	0.4 *1*	5001.48	33/2$^+$	4179.08	29/2$^+$	E2	R=1.5 *3*.
835.3 *1*	0.35 *6*	2211.18	15/2$^+$	1375.87	11/2$^+$	E2	R=1.26 *7*.
839.4 *1*	5.4 *2*	4421.96	31/2$^-$	3582.74	27/2$^-$	E2	R=1.5 *2*.
846.4 *1*	1.2 *3*	6366.95	39/2$^-$	5520.61	35/2$^-$	E2	R=1.36 *10*.
857.2 *1*	14.3 *4*	4203.27	31/2$^+$	3346.00	27/2$^+$	E2	R=1.43 *2*.
875.9 *1*	3.0 *2*	4421.96	31/2$^-$	3545.97	27/2$^-$	E2	R=1.45 *12*.
877.8 *1*	0.9 *2*	4223.88	29/2$^+$	3346.00	27/2$^+$		R=1.22 *10*.
880.4 *1*	1.6 *2*	3246.58	23/2$^+$	2366.10	23/2$^+$	D	R=1.29 *8*, ΔJ=0.
890.1 *1*	78 *2*	1859.15	19/2$^-$	969.01	15/2$^-$	E2	R=1.36 *4*.
915.5 *1*	2.0 *1*	5417.86	35/2$^+$	4502.49	31/2$^+$	E2	R=1.46 *9*.
916.2 *1*	2.6 *2*	6307.97	39/2$^-$	5391.77	35/2$^-$	E2	R=1.32 *14*.
918.4 *1*	0.8 *1*	5174.22	33/2$^+$	4255.88	29/2$^+$	E2	R=1.4 *2*.
920.1 *1*	0.5 *1*	2862.21	21/2$^+$	1942.13	19/2$^+$	(M1+E2)	R=0.59 *13*.
930.0 *5*	<0.3	2966.4	21/2$^-$	2036.23	17/2$^-$	E2	R=1.41 *4*.
932.3 *1*	0.8 *1*	5417.86	35/2$^+$	4485.41	31/2$^+$	E2	R=1.4 *2*.
935.0 *5*	0.6 *1*	5936.30	37/2$^+$	5001.48	33/2$^+$	[E2]	
938.4 *1*	3.0 *2*	4194.47	29/2$^-$	3255.97	25/2$^-$	E2	R=1.42 *10*.
944.4 *1*	0.9 *1*	3115.24	21/2$^+$	2170.79	19/2$^-$	D	R=0.81 *7*.
958.3 *1*	1.6 *1*	2671.22	21/2$^-$	1712.80	17/2$^-$	E2	R=1.4 *2*.
969.8 *1*	5.4 *4*	5391.77	35/2$^-$	4421.96	31/2$^-$	E2	R=1.30 *10*.
971.5 *1*	14.7 *5*	2830.49	23/2$^-$	1859.15	19/2$^-$		R=1.23 *6*.
975.1 *1*	0.5 *1*	6366.95	39/2$^-$	5391.77	35/2$^-$	[E2]	
980.0 *1*	21.1 *8*	3346.00	27/2$^+$	2366.10	23/2$^+$	E2	R=1.44 *3*.
995.0 *5*	0.2 *1*	5174.22	33/2$^+$	4179.08	29/2$^+$		
997.4 *1*	0.2 *1*	2526.51	19/2$^-$	1529.03	15/2$^-$	E2	R=1.3 *2*.
1005.6 *1*	0.6 *1*	7431.44	(43/2$^+$)	6425.83	39/2$^+$		
1008.1 *1*	2.1 *2*	6425.83	39/2$^+$	5417.86	35/2$^+$	E2	R=1.42 *9*.
1018.0 *5*	0.3 *1*	3688.46	(25/2$^-$)	2671.22	21/2$^-$		
1027.7 *1*	0.6 *1*	5858.23	37/2$^+$	4830.64	33/2$^+$	E2	R=1.2 *2*.
1031.1 *1*	8.8 *6*	2890.43	23/2$^-$	1859.15	19/2$^-$	E2	R=1.41 *4*.
1035.1 *1*	2.2 *1*	6277.42	39/2$^+$	5242.32	35/2$^+$	E2	R=1.36 *7*.
1039.0 *1*	6.0 *3*	5242.32	35/2$^+$	4203.27	31/2$^+$	E2	R=1.29 *6*.
1041.8 *1*	0.9 *1*	4145.64	29/2$^{(+)}$	3103.86	25/2$^+$	E2	R=1.26 *10*.
1051.0 *5*	0.7 *2*	4633.67	29/2	3582.74	27/2$^-$		
1067.2 *1*	<1	2036.23	17/2$^-$	969.01	15/2$^-$	M1+E2	R=0.45 *5*.
1067.6 *1*	1.3 *1*	3433.77	25/2$^+$	2366.10	23/2$^+$	D	R=0.65 *6*.
1069.0 *5*	0.9 *2*	5263.5	(33/2$^-$)	4194.47	29/2$^-$		
1075.1 *1*	6.0 *3*	4657.87	29/2$^-$	3582.74	27/2$^-$	M1+E2	R=0.45 *2*.
1081.5[@] *1*	0.3 *1*	6818.1	41/2$^-$	5735.67	37/2$^-$		E_γ: poor fit; level energy difference is equal to 1082.40 *14*.
1097.6 *1*	1.2 *1*	3988.03	27/2$^-$	2890.43	23/2$^-$	E2	R=1.8 *2*.
1118.4 *1*	0.5 *1*	2831.14	19/2$^{(+)}$	1712.80	17/2$^-$	D	R=0.80 *6*.
1139.3 *1*	1.4 *1*	4485.41	31/2$^+$	3346.00	27/2$^+$	E2	R=1.58 *14*.
1148.9 *1*	0.9 *1*	5391.77	35/2$^-$	4242.91	31/2$^-$	E2	R=1.7 *10*.
1152.1 *1*	0.4 *1*	4255.88	29/2$^+$	3103.86	25/2$^+$		
1156.7 *1*	0.9 *1*	4502.49	31/2$^+$	3346.00	27/2$^+$		
1173.3 *1*	2.4 *1*	3115.24	21/2$^+$	1942.13	19/2$^+$	D	R=0.67 *6*.
1184.0 *5*	0.3 *1*	7421.1	43/2$^-$	6237.1	39/2$^-$	[E2]	
1187.2 *1*	1.8 *1*	5430.16	33/2$^-$	4242.91	31/2$^-$	M1+E2	R=0.51 *7*.
1201.8 *1*	4.3 *2*	2170.79	19/2$^-$	969.01	15/2$^-$	E2	R=1.56 *13*.
1203.9 *1*	1.6 *1*	3062.99	21/2$^{(+)}$	1859.15	19/2$^-$	D	R=0.87 *7*.
1234.0 *5*	0.6 *1*	8052.1	45/2$^-$	6818.1	41/2$^-$	[E2]	
1278.0 *5*	4.4 *2*	5520.61	35/2$^-$	4242.91	31/2$^-$	E2	R=1.38 *10*.
1280.3 *1*	1.2 *1*	3646.47	25/2$^+$	2366.10	23/2$^+$	M1+E2	R=0.59 *6*.
1304.2 *1*	0.9 *2*	3246.58	23/2$^+$	1942.13	19/2$^+$	E2	R=1.29 *5*.

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^{124}Sn(^{13}C,4nγ) 1995Ju02 (continued)

γ(^{133}Ba) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
							E_γ: poor fit, level energy difference is equal to 1304.45 *5*.
1308.5 *1*	0.5 *1*	7585.93	(43/2$^+$)	6277.42	39/2$^+$		
1311.9 *1*	0.6 *1*	4657.87	29/2$^-$	3346.00	27/2$^+$	D	R=0.80 *9*.
1321.3 *1*	0.6 *1*	4425.14	27/2	3103.86	25/2$^+$	D	R=0.94 *11*.
1419.0 *1*	2.1 *1*	5661.92	35/2$^-$	4242.91	31/2$^-$	E2	R=1.35 *14*.
1601.8 *1*	0.4 *1*	3967.91		2366.10	23/2$^+$		

[†] From 1995Ju02, except as noted.
[‡] From 1995Ju02. R=Iγ(37° or 143°)/Iγ(79° or 101°) ratio is 1.4 − 1.5 for known ΔJ=0 dipole and ΔJ=2 quadrupole (E2) transitions, while for known stretched dipole transitions it is about 0.8; for many cases, when R is small ($\approx$ 0.4), transitions connect levels with ΔJ=1 and have D+Q (M1+E2) multipolarities.
[#] Multiply placed with intensity suitably divided.
[@] Placement of transition in the level scheme is uncertain.

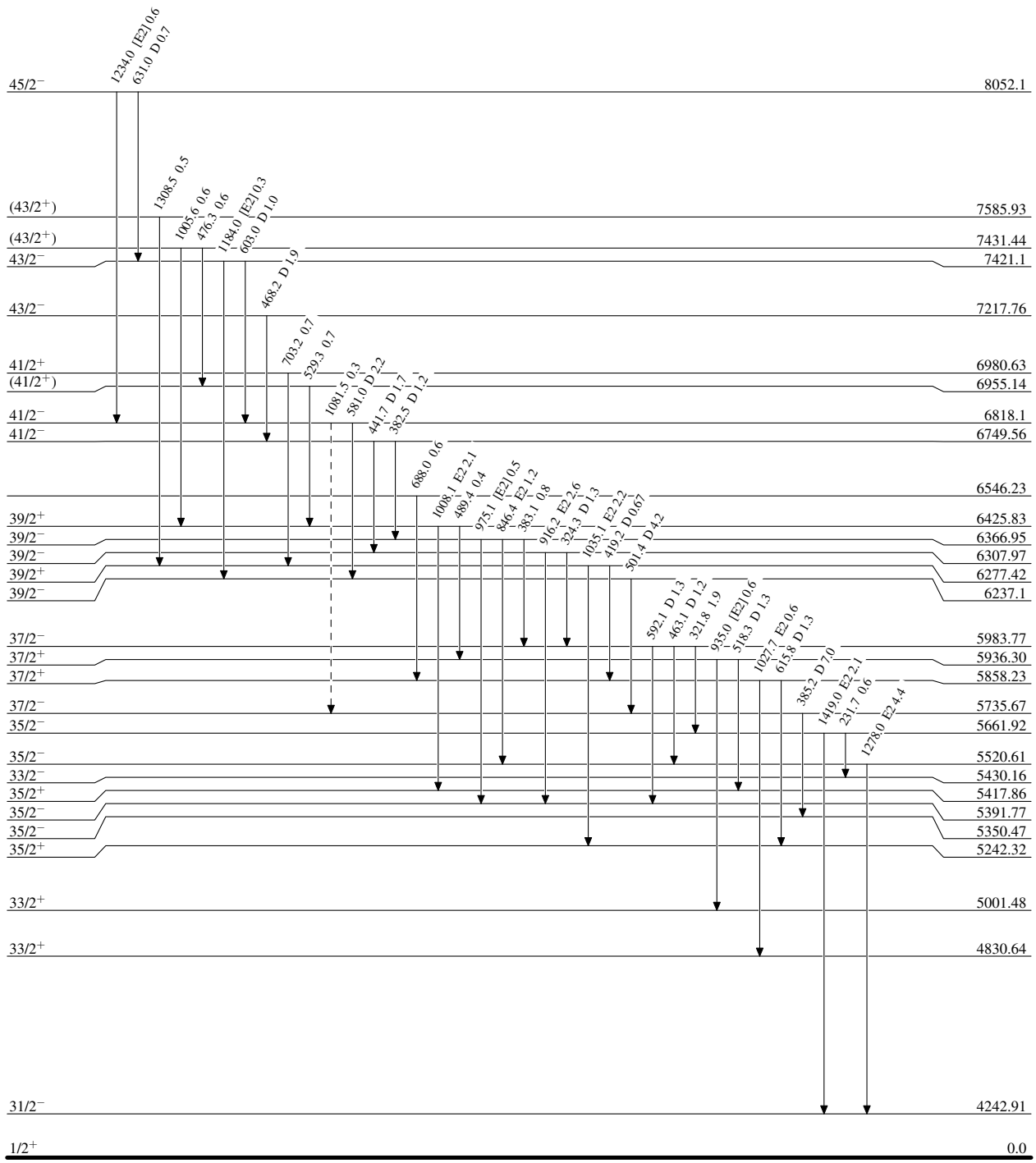
^{124}Sn(^{13}C,4nγ) 1995Ju02

Level Scheme

Intensities: Relative I_γ

Legend

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



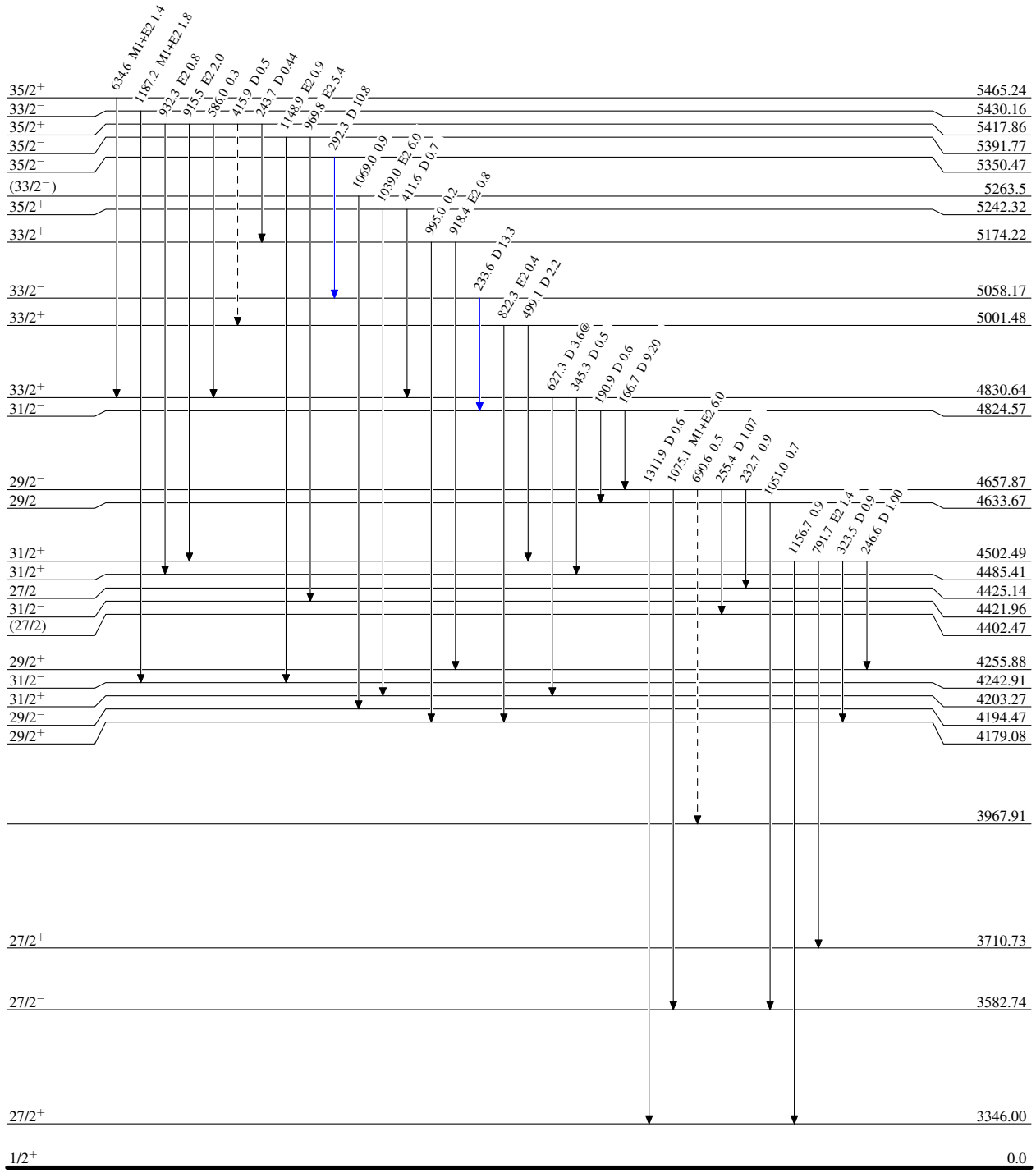
$^{133}_{56}Ba_{77}$

^{124}Sn(^{13}C,4nγ) 1995Ju02

Level Scheme (continued)

Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

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)



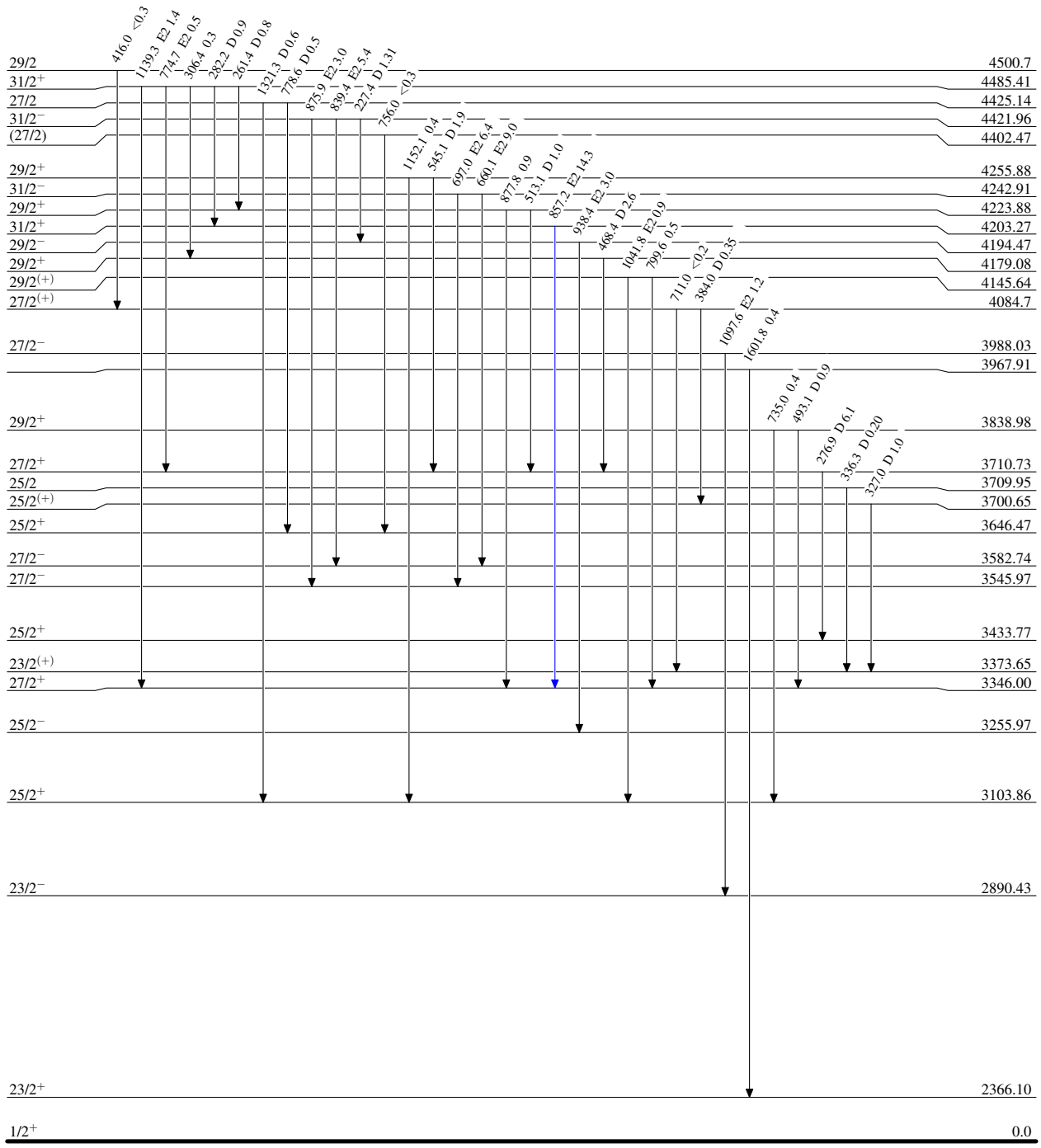
$^{133}_{56}Ba_{77}$

^{124}Sn(^{13}C,4nγ) 1995Ju02

Level Scheme (continued)

Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



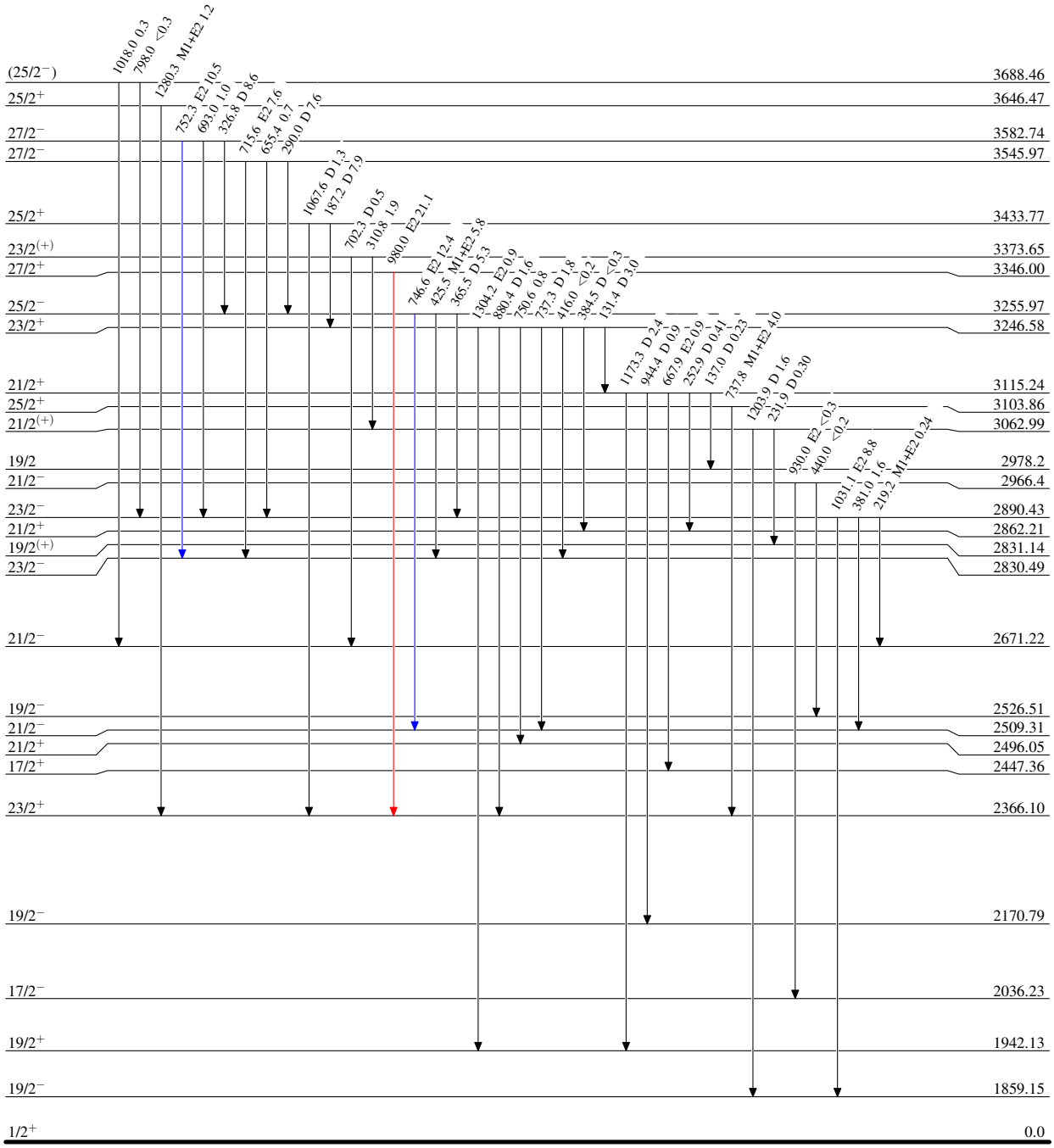
$^{133}_{56}Ba_{77}$

^{124}Sn(^{13}C,4nγ) 1995Ju02

Level Scheme (continued)

Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



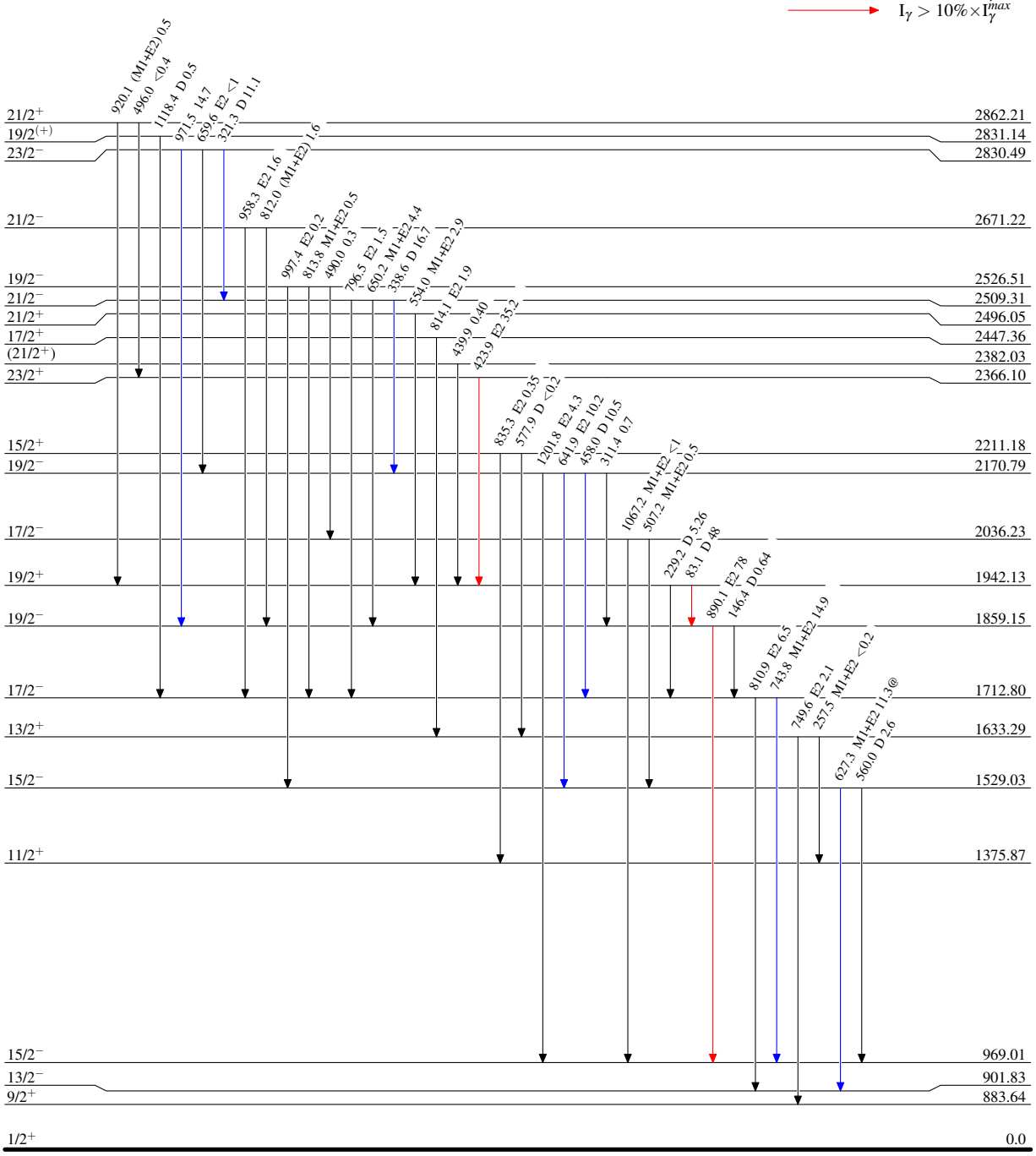
$^{133}_{56}Ba_{77}$

^{124}Sn(^{13}C,4nγ) 1995Ju02

Level Scheme (continued)

Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



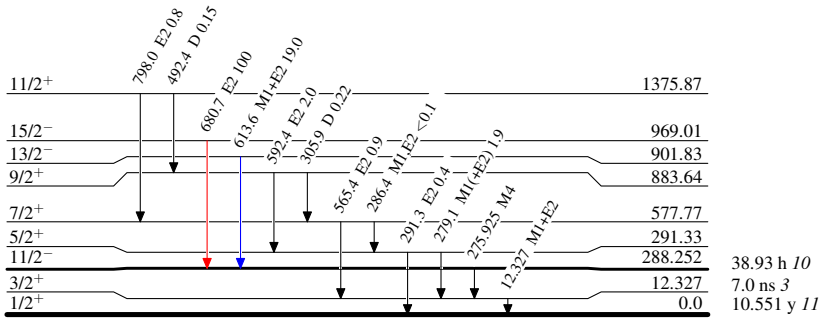
$^{133}_{56}Ba_{77}$

^{124}Sn(^{13}C,4nγ) 1995Ju02

Level Scheme (continued)

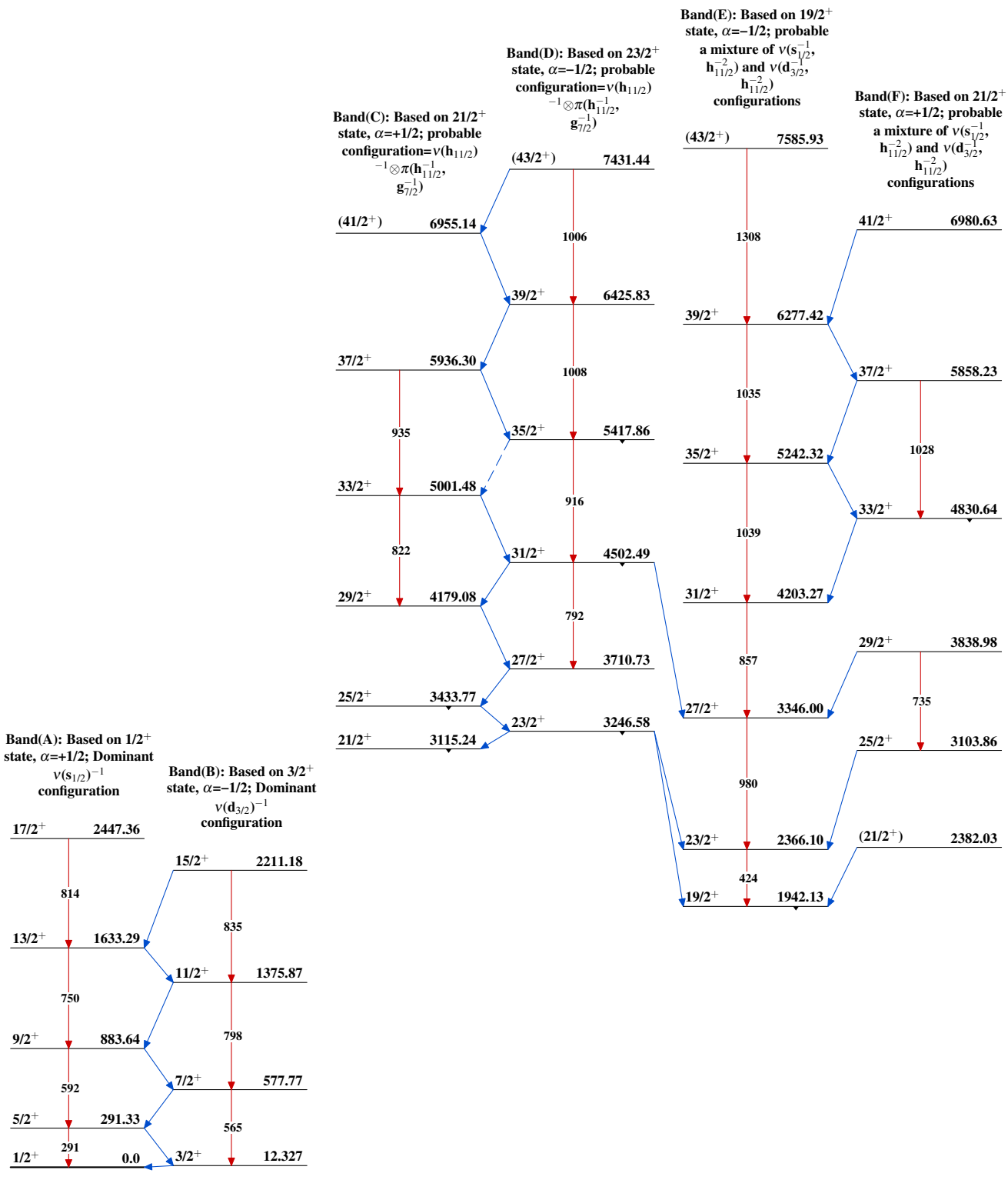
Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



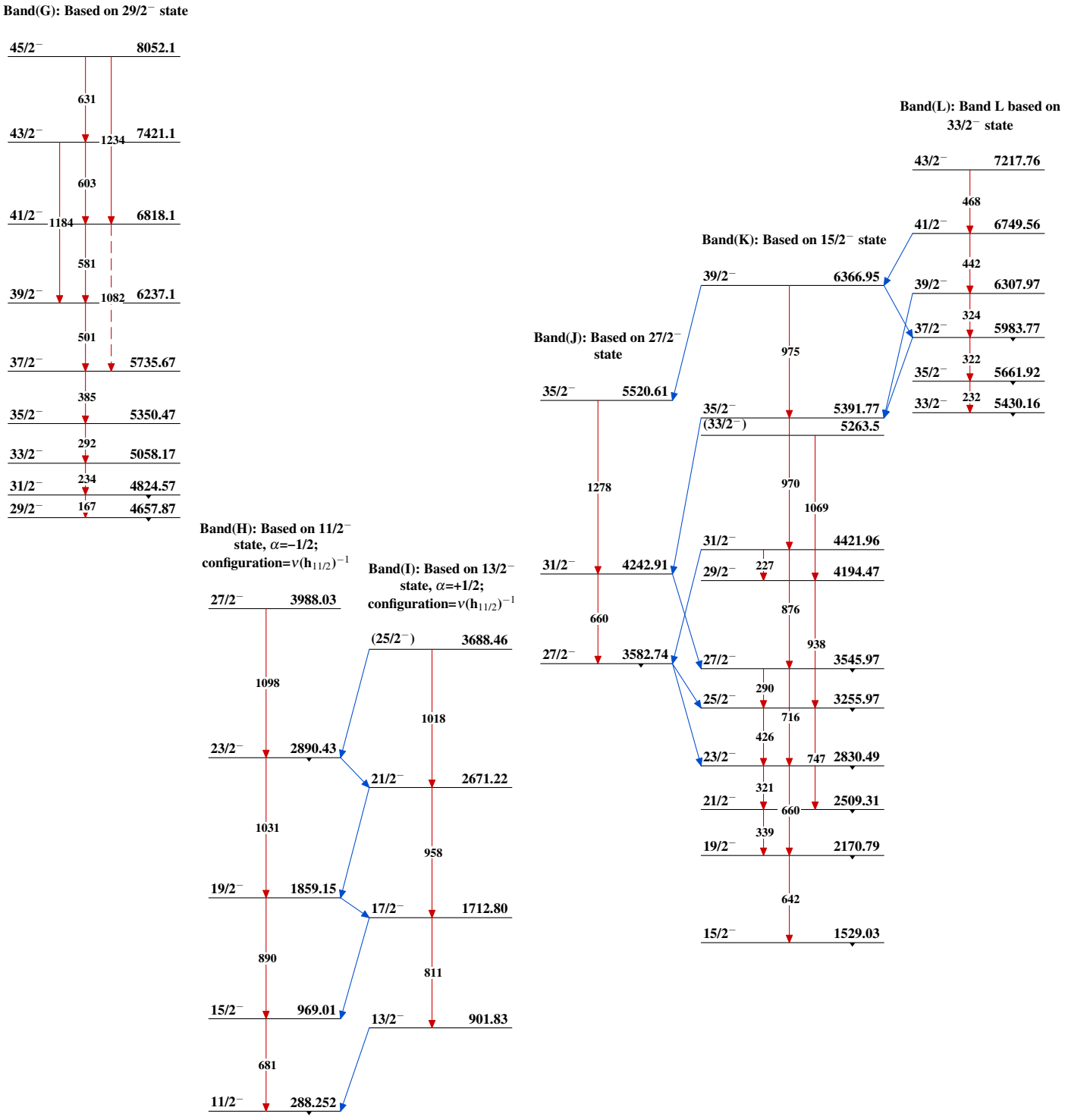
$^{133}_{56}Ba_{77}$

^{124}Sn(^{13}C,4nγ) 1995Ju02



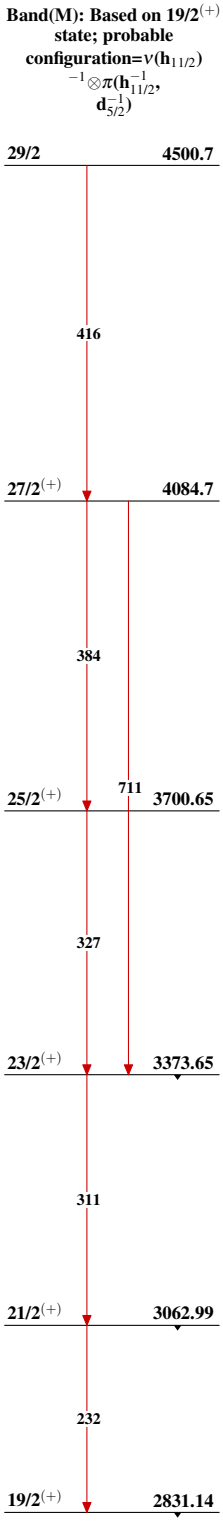
$^{133}_{56}Ba_{77}$

^{124}Sn(^{13}C,4nγ) 1995Ju02 (continued)



$^{133}_{56}Ba_{77}$

^{124}Sn(^{13}C,4nγ) 1995Ju02 (continued)



$^{133}_{56}Ba_{77}$

^{132}Ba(pol d,p) E=12 MeV 2009Su18,1970Vo04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov and A. Rodionov, F. G. Kondev	NDS 112, 855 (2011)	31-Oct-2010

2009Su18: ^{132}Ba(pol d,p), E=24.0 MeV; measured σ(E,θ) at 10 angles between 6°−40°. ^{133}Ba; deduced analyzing power, levels, L(n), J^{π}, S. MP Tandem accelerator, polarized deuteron beam, Q3D spectrograph, FWHM=6-7 keV, long focal-plane detector, DWBA analysis, interacting boson-fermion model and shell model calculations.

1970Vo04: ^{132}Ba(d,p), 12 MeV; measured σ(E,θ), θ=5°, 50°, deduced levels, L(n), J^{π}, S. Van de Graaff, broad-range magnetic spectrograph, FWHM=13-15 keV, DWBA analysis.

^{133}Ba Levels

E(level)[†]	J^{π}[@]	L	$(2J+1)S_{lj}$	Comments
0	$1/2^+$	0	0.47	dσ/dΩ=2.12 mb/sr *3*.
12.3 *5*	$3/2^+$	2	1.13	dσ/dΩ=1.86 mb/sr *3*.
288.3 *5*	$11/2^-$	5	2.30	dσ/dΩ=2.96 mb/sr *4*.
294[#] *5*				
302.8 *5*	$3/2^+$	2	0.19	dσ/dΩ=330 μb/sr *7*.
500[#] *5*	$1/2^+$	0	≈0.02	
576.6 *5*	$(7/2^+)$	(4)	0.12	dσ/dΩ=22 μb/sr *1*.
630.8 *5*	$5/2^+$	2	0.30	dσ/dΩ=515 μb/sr *9*.
674.3 *5*	$3/2^+$	2	0.03	dσ/dΩ=87 μb/sr *4*.
791.1 *5*	$7/2^-$	3	0.18	dσ/dΩ=283 μb/sr *6*.
858.5 *5*	$3/2^+$	2	0.24	dσ/dΩ=397 μb/sr *7*.
886.0 *5*	$5/2^+$	2	0.12	dσ/dΩ=195 μb/sr *5*.
969.4 *5*				dσ/dΩ=6.0 μb/sr *10*.
1066.8 *5*				dσ/dΩ=2.8 μb/sr *7*.
1111.2[‡] *5*	$5/2^-$,$7/2^-$	3	0.004, 0.003	dσ/dΩ=4.9 μb/sr *10*.
1211.1 *5*				dσ/dΩ=1.9 μb/sr *3*.
1247.7 *5*	$1/2^+$	0	0.10	dσ/dΩ=433 μb/sr *10*.
1271.3 *5*	$7/2^-$	3	1.63	dσ/dΩ=2.79 mb/sr *5*.
1283.6 *5*	$3/2^-$	1	0.52	dσ/dΩ=1.46 mb/sr *3*.
1329.5[‡] *5*	$7/2^-$	3	0.14	dσ/dΩ=233 μb/sr *12*.
1501.5 *5*				dσ/dΩ=9 μb/sr *3*.
1563.6 *5*	$5/2^+$	2	0.05	dσ/dΩ=96 μb/sr *6*.
1582.7 *5*	$1/2^-$	1	0.14	dσ/dΩ=589 μb/sr *12*.
1616.1 *5*				dσ/dΩ=33 μb/sr *3*.
1689.3 *5*				dσ/dΩ=3.9 μb/sr *5*.
1704.7 *5*				dσ/dΩ=1.7 μb/sr *25*.
1770.9[‡] *5*	$5/2^-$	3	0.27	dσ/dΩ=366 μb/sr *10*.
1833.7 *5*				dσ/dΩ=41 μb/sr *4*.
1872.4 *5*				dσ/dΩ=41 μb/sr *3*.
1938.3 *5*				dσ/dΩ=42 μb/sr *2*.
1968.2 *5*	$7/2^-$	3	0.05	dσ/dΩ=110 μb/sr *7*.
2017.0 *5*				dσ/dΩ=52 μb/sr *6*.
2025.1 *5*				dσ/dΩ=108 μb/sr *7*.
2075.8 *5*	$3/2^-$	1	0.02	dσ/dΩ=96 μb/sr *6*.
2101.3 *5*				dσ/dΩ=14 μb/sr *3*.
2113.4 *5*	$3/2^-$	1	0.02	dσ/dΩ=81 μb/sr *6*.
2142.2 *5*	$(7/2^-)$	(3)	0.03	dσ/dΩ=61 μb/sr *4*.
2171.2 *5*	$5/2^-$	3	0.08	dσ/dΩ=137 μb/sr *7*.
2223.0 *5*				dσ/dΩ=13 μb/sr *2*.
2245.3 *5*				dσ/dΩ=21 μb/sr *3*.
2266.9 *5*				dσ/dΩ=26 μb/sr *4*.
2288.1 *5*	$7/2^-$	3	0.01	dσ/dΩ=92 μb/sr *5*.
2325.3 *5*				dσ/dΩ=115 μb/sr *7*.

Continued on next page (footnotes at end of table)

^{132}Ba(pol d,p) E=12 MeV 2009Su18,1970Vo04 (continued)

^{133}Ba Levels (continued)

E(level)[†]	Comments
2338.8 *5*	dσ/dΩ=92 μb/sr *6*.
2409[#] *20*	

[†] From 2009Su18, except as noted. According to authors, evaluators assigned ΔE=0.5 keV for each level energy.
[‡] Possible a doublet.
[#] From 1970Vo04.
[@] From L-value and analyzing power (2009Su18).