^{124}Sn(^{44}Ca,4nγ) 1996Xi01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 147, 1 (2018)	30-Nov-2017

Includes ^{138}Ba(^{30}Si,4nγ) (1998Fr14) and ^{128}Te(^{40}Ar,4nγ) (1976Bo27).

1996Xi01: E=189 MeV. Measured Eγ, GGG, lifetimes by DOPPLER-broadened line-shape analysis using an array of 20 COMPTON-suppressed Ĝe detectors.

1976Bo27 (also 1976Bo30,1972Bo61,1972Bo32): ^{128}Te(^{40}Ar,4nγ) E=170-190 MeV. Measured lifetimes by recoil-distance Doppler-shift (RDDS) method for members of the ground-state band.

Others:

2000Le17: ^{138}Ba(^{30}Si,4nγ) E=140-155 MeV. Measured Eγ, $\gamma\gamma$ coin. Study of rotational continuum, statistical analysis, deduced properties of feeding transitions for high-spin levels.

1998Fr14 (also 1999Fr37,1999Fr11,1999Le20,1999Dr12): ^{138}Ba(^{30}Si,4nγ) E=150 MeV. DSA measurement of unresolved γ transitions forming the rotational quasi-continuum spectrum.

Others (dealing with the measurements of continuum spectra):

1993Le03: ^{124}Sn(^{44}Ca,4n) E=189 MeV. Measured $\gamma\gamma$ coin, $\gamma\gamma(\theta)$, $T_{1/2}$ of continuum states.

1993Th02: ^{100}Mo(^{64}Ni,X) E=232 MeV and ^{148}Sm(^{16}O,X) E=82 MeV. Measured γ-multiplicity, deduced ^{164}Yb excited states built on GDR.

1989Ha34: ^{100}Mo(^{64}Ni,X) E=210-235 MeV. Measured γ-multiplicity, deduced spin distribution.

1983Ga16: ^{116}Cd(^{50}Ti,X) E=230 MeV. Measured entry-region γ spectra, deduced γ-ray fold distribution.

^{164}Yb Levels

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$[@]	E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$[@]
0.0[g]	0$^+$		3933.3[h]	18$^+$	0.74 ps *35*
123.3[g]	2$^+$[#]	882 ps *35*	3942.1[f]	17$^-$	
385.5[g]	4$^+$[#]	29.7 ps *10*	4231.0[&d]	16$^-$	
760.4[g]	6$^+$[#]	7.24 ps *17*	4392.2[g]	18$^+$	
1223.6[g]	8$^+$	1.5 ps *5*	4445.1[e]	18$^-$	
1442.2[f]	5$^-$		4552.4[f]	19$^-$	
1550.9[e]	4$^-$		4565.7[h]	20$^+$	0.29 ps *13*
1675.4[f]	7$^-$		4933[&d]	18$^-$	
1753.9[g]	10$^+$	0.82 ps *28*	5067.1[e]	20$^-$	
1798.5[e]	6$^-$		5098.6[g]	20$^+$	
2000.1[f]	9$^-$		5206.4[f]	21$^-$	
2123.6[e]	8$^-$		5278.4[h]	22$^+$	0.173 ps *21*
2330.6[g]	12$^+$	0.55 ps *21*	5688.8[e]	22$^-$	
2401.2[f]	11$^-$		5805.6[g]	22$^+$	
2483.4[e]	10$^-$		5907.4[f]	23$^-$	0.159 ps *21*
2538.8[&d]	10$^-$		6059.1[h]	24$^+$	0.132[a] ps *+42−21*
2863.9[f]	13$^-$		6372.7[e]	24$^-$	
2864.5[e]	12$^-$		6666.6[f]	25$^-$	0.159 ps *35*
2900.1[g]	14$^+$	0.73 ps *21*	6897.3[h]	26$^+$	0.104[b] ps *+28−21*
3030.4[&d]	12$^-$		7149.3[e]	26$^-$	
3087.4[h]	14$^+$		7495.0[f]	27$^-$	
3317.8[e]	14$^-$		7786.5[h]	28$^+$	0.049[c] ps *+21−14*
3378.3[f]	15$^-$		8018.7[e]	28$^-$	
3390.0[h]	16$^+$	1.75 ps *35*	8397.1[f]	29$^-$	
3593.0[&d]	14$^-$		8725.4[h]	30$^+$	0.083 ps *+35−28*
3696.6[g]	16$^+$		8971.0[e]	30$^-$	
3849.3[e]	16$^-$		9367.2[f]	31$^-$	

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^{124}Sn(^{44}Ca,4nγ) 1996Xi01 (continued)

^{164}Yb Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[@]
9715.0[h]	32^+	0.083 ps *42*
9987[e]	32^-	
10371[f]	(33^-)	
10746.8[h]	34^+	
11820[h]	(36^+)	
12934[h]	(38^+)	

[†] From least-squares fit to Eγ data, assuming Δ(Eγ)=0.5 keV for each γ ray. Level-energy uncertainties vary from 0.5 to 2 keV.
[‡] As proposed by 1996Xi01 unless otherwise stated.
[#] From Adopted Levels.
[@] From recoil-distance Doppler-shift (RDDS) method (1976Bo27) up to 18^+ in the ground-state band. Above 18^+, values are from Doppler-broadened line shapes (1996Xi01). Transition quadrupole moments are deduced by 1996Xi01 from lifetime data and listed for the levels with measured lifetime.
[&] See Adopted Levels and/or (^{16}O,4nγ) for a corresponding band member at a different energy due to revisions in level scheme.
[a] 0.589 ps *4* (1998Fr14), effective $T_{1/2}$ from F(τ).
[b] 0.565 ps *4* (1998Fr14), effective $T_{1/2}$ from F(τ).
[c] 0.347 ps *4* (1998Fr14), effective $T_{1/2}$ from F(τ).
[d] Band(A): (π=−,α=0) band based on 10^-. Note that the band members are different in Adopted Levels due to additional transitions in the cascade defining this band, as given in the ^{152}Sm(^{16}O,4nγ) dataset.
[e] Band(B): Band based on 4^-,α=0.
[f] Band(b): Band based on 5^-,α=1.
[g] Band(C): g.s. band.
[h] Band(D): Band based on 14^+,α=0.

γ(^{164}Yb)

Eγ	Iγ	E_i(level)	J_i^π	E_f	J_f^π	Eγ	Iγ	E_i(level)	J_i^π	E_f	J_f^π
123.3		123.3	2^+	0.0	0^+	491.6[†]		3030.4	12^-	2538.8	10^-
247.6		1798.5	6^-	1550.9	4^-	514.4	16.1 *9*	3378.3	15^-	2863.9	13^-
262.2		385.5	4^+	123.3	2^+	530.4		1753.9	10^+	1223.6	8^+
290.9	2.6 *2*	3378.3	15^-	3087.4	14^+	531.5		3849.3	16^-	3317.8	14^-
324.7	<1.0	2000.1	9^-	1675.4	7^-	533.3	9.5 *5*	2863.9	13^-	2330.6	12^+
325.0		2123.6	8^-	1798.5	6^-	543.3		3933.3	18^+	3390.0	16^+
356.4		1798.5	6^-	1442.2	5^-	562.6[†]		3593.0	14^-	3030.4	12^-
359.7		2483.4	10^-	2123.6	8^-	563.8		3942.1	17^-	3378.3	15^-
374.8		760.4	6^+	385.5	4^+	569.5		2900.1	14^+	2330.6	12^+
381.1		2864.5	12^-	2483.4	10^-	576.7		2330.6	12^+	1753.9	10^+
401.1	4.4 *2*	2401.2	11^-	2000.1	9^-	595.8		4445.1	18^-	3849.3	16^-
415.2[†]		2538.8	10^-	2123.6	8^-	609.2		3696.6	16^+	3087.4	14^+
448.3		2123.6	8^-	1675.4	7^-	610.3	12.1 *7*	4552.4	19^-	3942.1	17^-
453.3		3317.8	14^-	2864.5	12^-	619.1	3.3 *3*	4552.4	19^-	3933.3	18^+
453.9		3317.8	14^-	2863.9	13^-	621.7		5688.8	22^-	5067.1	20^-
462.7	<6.6	2863.9	13^-	2401.2	11^-	622[‡]		5067.1	20^-	4445.1	18^-
463.2		1223.6	8^+	760.4	6^+	632.4		4565.7	20^+	3933.3	18^+
463.3		2864.5	12^-	2401.2	11^-	638[†]		4231.0	16^-	3593.0	14^-
483.3		2483.4	10^-	2000.1	9^-	647.3	13.8 *6*	2401.2	11^-	1753.9	10^+
489.9		3390.0	16^+	2900.1	14^+	654.0		5206.4	21^-	4552.4	19^-

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^{124}Sn(^{44}Ca,4nγ) 1996Xi01 (continued)

γ(^{164}Yb) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	E_γ	E_i(level)	J_i^π	E_f	J_f^π
683.9		6372.7	24^-	5688.8	22^-	889.2	7786.5	28^+	6897.3	26^+
695.6		4392.2	18^+	3696.6	16^+	900	2123.6	8^-	1223.6	8^+
701.0		5907.4	23^-	5206.4	21^-	902.1	8397.1	29^-	7495.0	27^-
702†		4933	18^-	4231.0	16^-	915.1	1675.4	7^-	760.4	6^+
706.4		5098.6	20^+	4392.2	18^+	938.9	8725.4	30^+	7786.5	28^+
707		5805.6	22^+	5098.6	20^+	952.3	8971.0	30^-	8018.7	28^-
712.7		5278.4	22^+	4565.7	20^+	970.1	9367.2	31^-	8397.1	29^-
756.8		3087.4	14^+	2330.6	12^+	989.6	9715.0	32^+	8725.4	30^+
759.2		6666.6	25^-	5907.4	23^-	1004‡	10371	(33^-)	9367.2	31^-
776.6	10.3	2000.1	9^-	1223.6	8^+	1015.7	9987	32^-	8971.0	30^-
776.6		7149.3	26^-	6372.7	24^-	1031.8	10746.8	34^+	9715.0	32^+
780.7		6059.1	24^+	5278.4	22^+	1038	1798.5	6^-	760.4	6^+
796.5		3696.6	16^+	2900.1	14^+	1056.8	1442.2	5^-	385.5	4^+
828.4		7495.0	27^-	6666.6	25^-	1073‡	11820	(36^+)	10746.8	34^+
838.2		6897.3	26^+	6059.1	24^+	1114‡	12934	(38^+)	11820	(36^+)
869.4		8018.7	28^-	7149.3	26^-					

† See Adopted Gammas and/or (^{16}O,4nγ) dataset for Adopted placement of this transition.
‡ Placement of transition in the level scheme is uncertain.

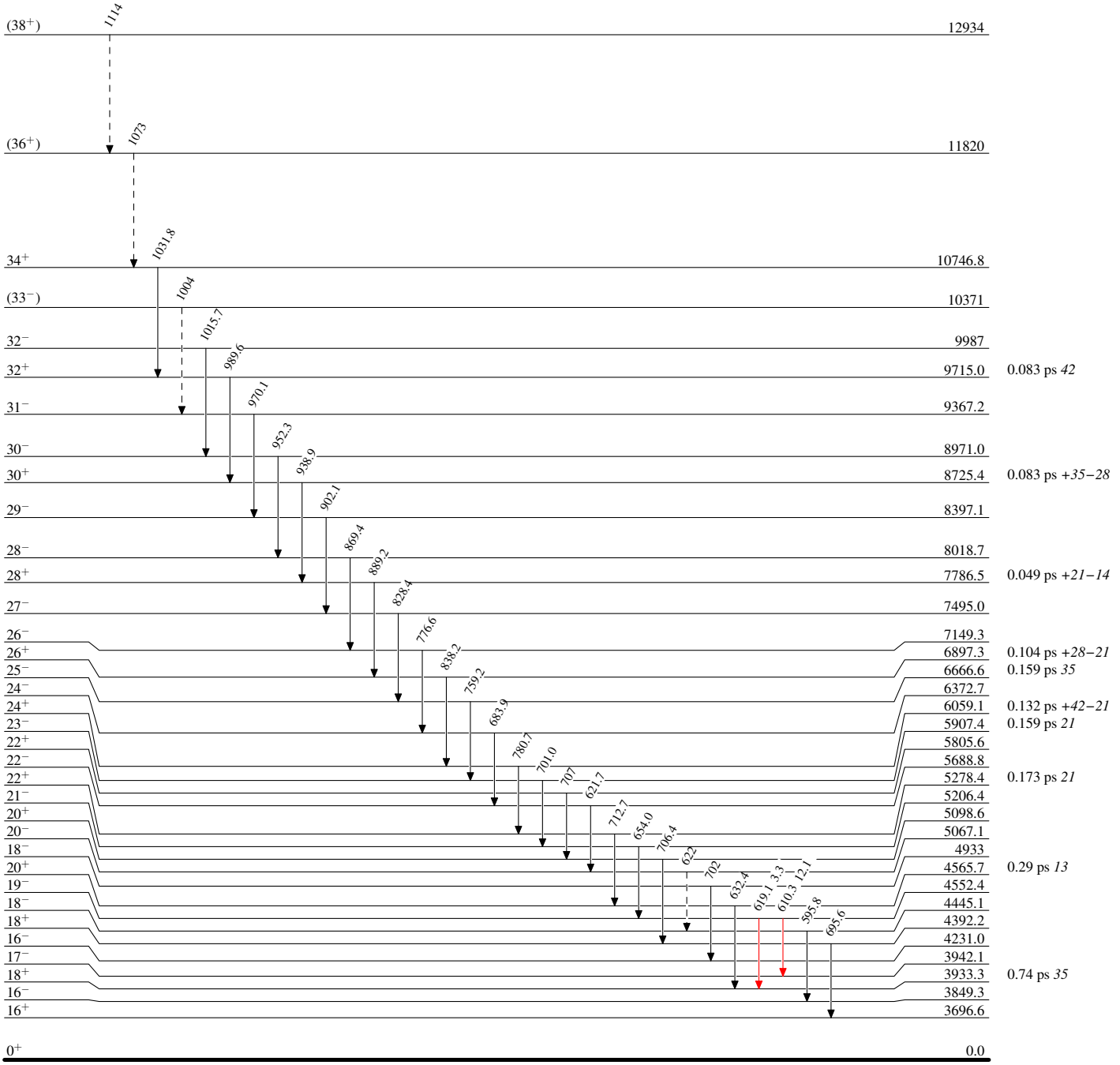
^{124}Sn(^{44}Ca,4nγ) **1996Xi01**

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)

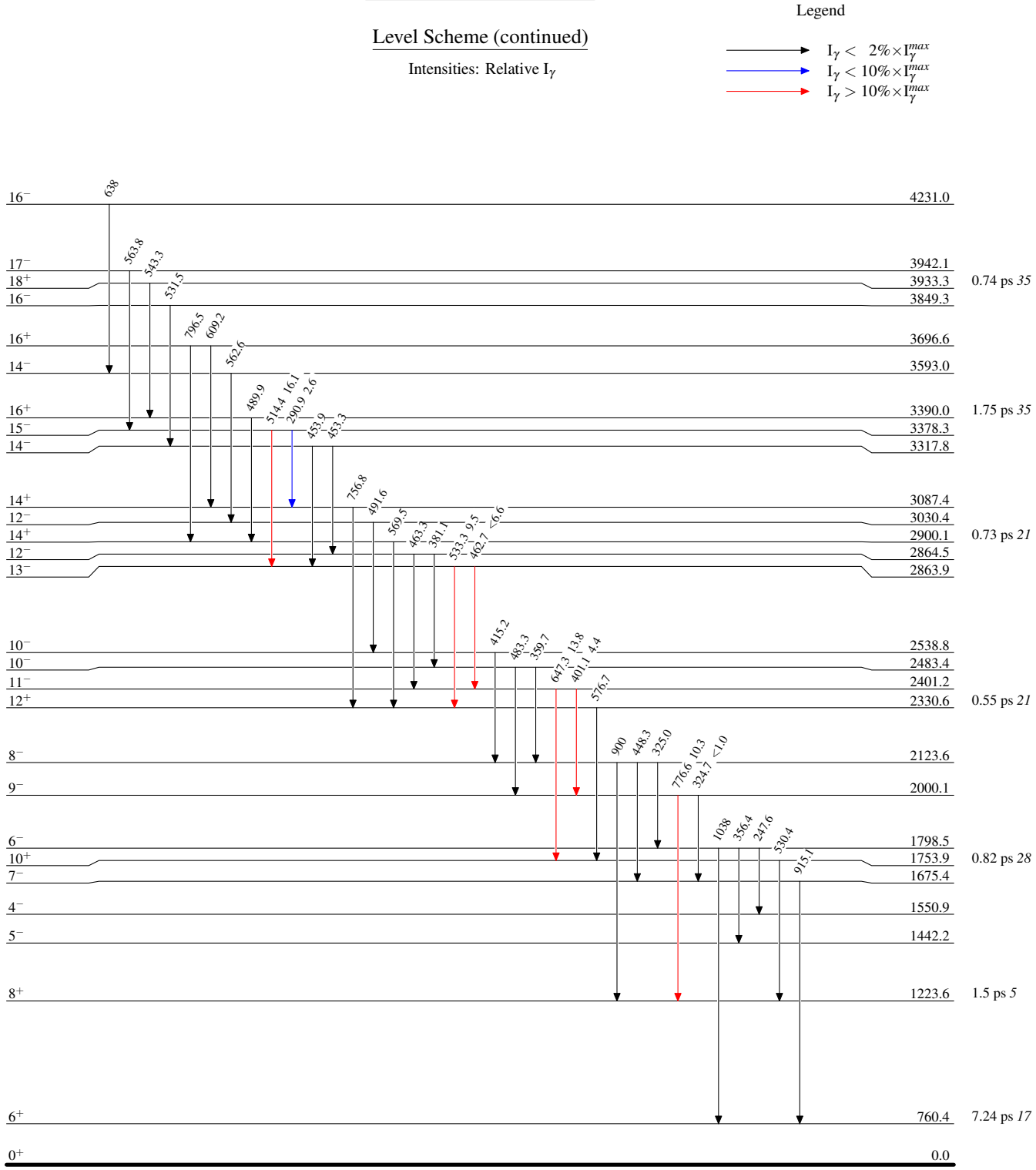


$^{164}_{70}Yb_{94}$

^{124}Sn(^{44}Ca,4nγ) 1996Xi01

Level Scheme (continued)

Intensities: Relative I_γ

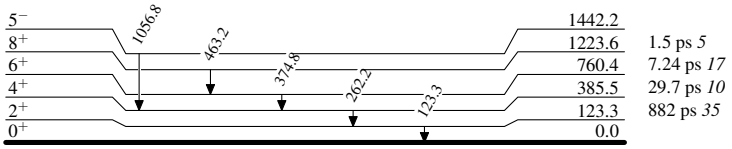


$^{164}_{70}Yb_{94}$

^{124}Sn(^{44}Ca,4nγ) 1996Xi01

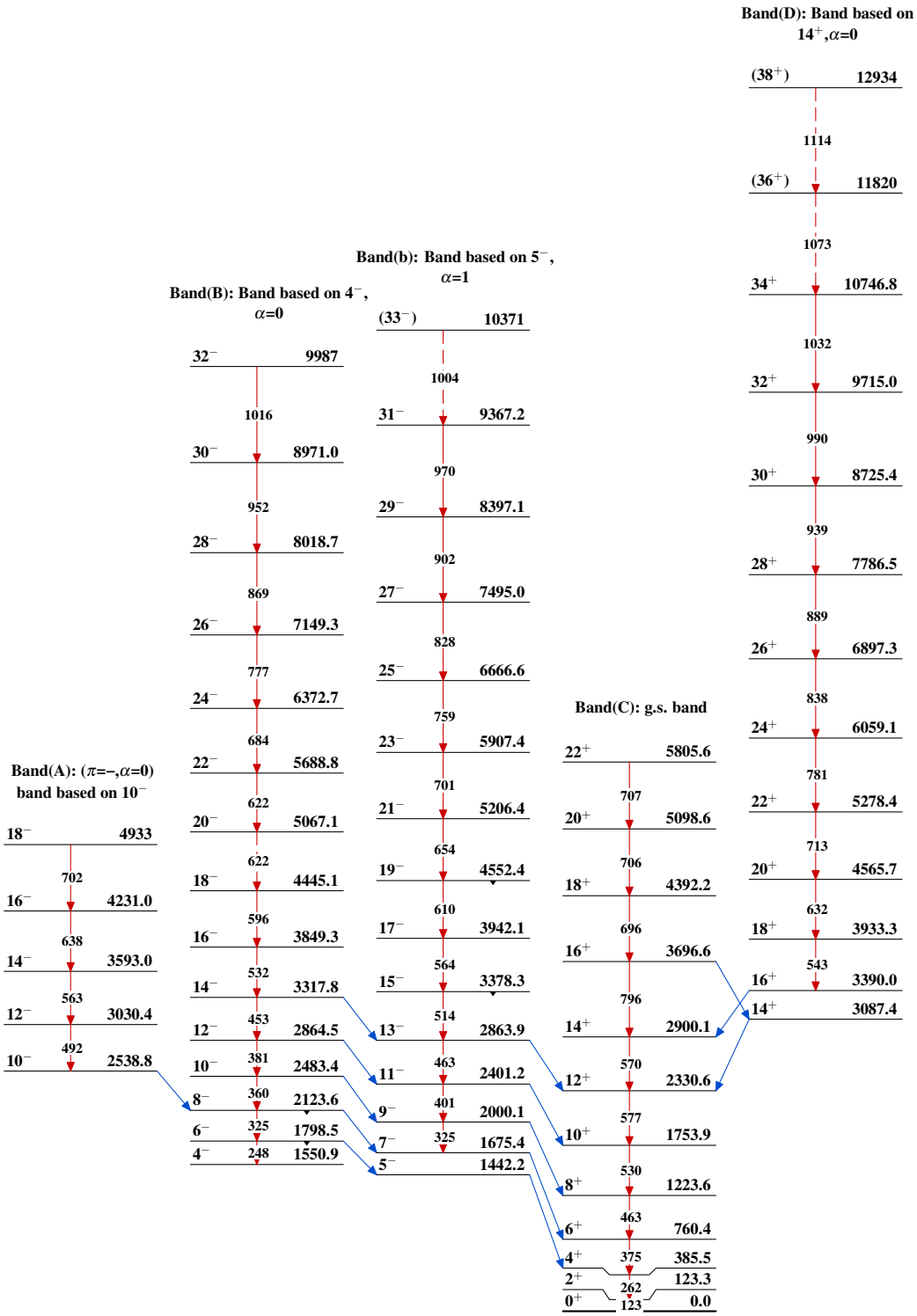
Level Scheme (continued)

Intensities: Relative I_γ



$^{164}_{70}Yb_{94}$

$^{124}Sn(^{44}Ca,4n\gamma)$ 1996Xi01



$^{164}_{70}Yb_{94}$