^{120}Sn(^{13}C,3nγ),^{116}Cd(^{18}O,4nγ) 1985Su03,2000St07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 93, 33 (2001)	11-May-2001

1985Su03 (also 1983Su09): ^{120}Sn(^{13}C,3nγ) E=45-58 MeV. Measured Eγ, Iγ, $\gamma\gamma$, excitation functions, $\gamma(\theta)$, ce.
2000St07: ^{116}Cd(^{18}O,4nγ) E=76 MeV. Measured lifetimes by recoil-distance Doppler shift method.
Others:
1985El08, 1984El08: ^{122}Sn(^{12}C,4nγ) E=80 MeV. Measured γ multiplicity, $\gamma\gamma$ energy correlation matrices.
Additional information 1.
1969Ro23, 1966Br14: ^{122}Sn(^{12}C,4nγ) E=65 MeV. Measured Eγ, Iγ, ce.
1965Mi02: ^{133}Cs(p,4nγ) E=27-55 MeV. Measured Eγ, Iγ.

^{130}Ba Levels

E(level)	J$^{\pi}$[†]	T$_{1/2}$[‡]	E(level)	J$^{\pi}$[†]	T$_{1/2}$[‡]	E(level)	J$^{\pi}$[†]	T$_{1/2}$[‡]
0.0[&]	0$^+$		2567.7[c] *3*	7$^-$	4.16 ps *14*	4255.7[b] *4*	(12$^+$)	1.52 ps *14*
357.1[&] *2*	2$^+$	43.2 ps *5*	2799.3[e] *3*	(8$^+$)		4353.6[c] *4*	(13$^-$)	
888.6 *3*			2927.7 *4*			4403.7 *4*		
901.4[&] *2*	4$^+$	3.83 ps *6*	2928.4[d] *3*	(8$^-$)		4782.9[a] *4*	(14$^+$)	0.41[@] ps *4*
907.4[e] *2*	2$^{(+)}$		3066.5[c] *3*	9$^-$	5.27 ps *14*	4878.9[d] *4*	(14$^-$)	
1360.4[e] *2*	3$^{(+)}$		3259.5[&] *3*	10$^+$	0.55 ps *7*	4884.9[b] *4*	(14$^+$)	3.4[@] ps *6*
1476.9[e] *2*	(4$^+$)		3289.5 *4*			5155.0[c] *5*	(15$^-$)	
1544.1 *4*			3422.5 *3*	10$^+$		5679.1[b] *5*	(16$^+$)	
1592.4[&] *3*	6$^+$	0.98 ps *6*	3434.5[d] *3*	(10$^-$)		5729.7[a] *5*	(16$^+$)	
2011.9[e] *3*	5$^+$		3602.1[e] *3*	(10$^+$)		5766.2[d] *5*	(16$^-$)	
2100.7[e] *2*	(6$^+$)		3658.5[c] *4*	11$^-$	2.10 ps *9*	6036.8[c] *5*	(17$^-$)	
2167.9[c] *3*	5$^-$		3789.3 *4*	(10$^+$)		6757.0[a] *5*	(18$^+$)	
2182.5 *3*			3962.2 *4*			6972.8[c] *6*		
2229.6 *4*			3989.2[a] *4*	12$^+$	2.15 ps *21*	8022.8[c] *6*		
2394.7[&] *3*	8$^+$	0.49 ps *14*	4077.5[d] *4*	(12$^-$)				
2474.5 *3*	8$^-$	9.4[#] ms *4*	4221.9[&] *4*	(12$^+$)				

[†] From 1985Su03, based on the $\gamma(\theta)$, excitation functions, and α(K)exp from ce data.
[‡] From RDDS (2000St07).
[#] From Adopted Levels.
[@] Effective half-life.
[&] Band(A): Ground-state band.
[a] Band(B): First S (super) band.
[b] Band(C): Second (S) band.
[c] Band(D): 5$^-$ band; π=−, α=1.
[d] Band(E): 5$^-$ band; π=−,α=0.
[e] Band(F): Quasi-γ band.

γ(^{130}Ba)

A$_2$, A$_4$ and α(K)exp′s are from 1985Su03.

Continued on next page (footnotes at end of table)

^{120}Sn(^{13}C,3nγ),^{116}Cd(^{18}O,4nγ) 1985Su03,2000St07 (continued)

γ(^{130}Ba) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[a]	Comments
163.0 *2*	<0.2	3422.5	10^+	3259.5	10^+			
357.1 *2*	100	357.1	2^+	0.0	0^+	E2	0.0263	α(K)=0.02169; α(L)=0.00366; α(M)=0.00076; α(N+..)=0.00020 A_2=+0.265 *6*, A_4=−0.052 *9*.
360.7 *2*	5.3 *3*	2928.4	(8^-)	2567.7	7^-	D+Q		A_2=−0.22 *2*, A_4=+0.04 *3*.
368.0 *2*	2.4 *3*	3434.5	(10^-)	3066.5	9^-			A_2=−0.40 *5*, A_4=+0.03 *1*.
399.8 *2*	8.2 *3*	2567.7	7^-	2167.9	5^-			A_2=+0.28 *2*, A_4=−0.12 *4*.
419.0 *2*	1.4[@] *5*	4077.5	(12^-)	3658.5	11^-			
452.9 *2*	1.7 *2*	1360.4	$3^{(+)}$	907.4	$2^{(+)}$	D+Q		A_2=0.00 *6*, A_4=+0.20 *10*.
462.3 *2*	2.1 *2*	2474.5	8^-	2011.9	5^+			
466.4 *2*	0.9[@] *4*	4255.7	(12^+)	3789.3	(10^+)			
467.1 *2*	0.8[@] *4*	2567.7	7^-	2100.7	(6^+)			
498.8 *2*	18.7 *2*	3066.5	9^-	2567.7	7^-	E2		α(K)exp=0.0073 *9* A_2=+0.34 *1*, A_4=−0.08 *2*.
506.1 *2*	4.5 *2*	3434.5	(10^-)	2928.4	(8^-)			A_2=+0.32 *4*, A_4=−0.09 *7*.
529.8 *2*	1.2 *2*	3789.3	(10^+)	3259.5	10^+			A_2=+0.36 *8*, A_4=+0.11 *12*.
531.5 *2*	2.6 *2*	888.6		357.1	2^+			
539.7 *2*	1.0 *2*	3962.2		3422.5	10^+			
544.3 *2*	77.8 *4*	901.4	4^+	357.1	2^+	E2		A_2=+0.259 *6*, A_4=−0.053 *9*.
550.3 *2*	3.0 *2*	907.4	$2^{(+)}$	357.1	2^+			A_2=+0.13 *2*, A_4=−0.08 *4*.
566.7 *2*	1.7[@] *5*	3989.2	12^+	3422.5	10^+			
569.5 *2*	3.4 *2*	1476.9	(4^+)	907.4	$2^{(+)}$			A_2=+0.24 *3*, A_4=−0.02 *5*.
575.5 *2*	3.2[@] *5*	1476.9	(4^+)	901.4	4^+			
575.5 *2*	1.2[@] *4*	2167.9	5^-	1592.4	6^+			
590.1 *2*	2.7 *2*	2182.5		1592.4	6^+			
592.0 *2*	14.3 *3*	3658.5	11^-	3066.5	9^-	E2		α(K)exp=0.0054 *7* A_2=+0.35 *2*, A_4=−0.08 *3*.
623.8 *2*	4.0 *2*	2100.7	(6^+)	1476.9	(4^+)			A_2=+0.21 *3*, A_4=−0.07 *5*.
629.2 *2*	4.3 *2*	4884.9	(14^+)	4255.7	(12^+)			A_2=+0.30 *4*, A_4=−0.10 *7*.
643.0 *2*	5.5 *2*	4077.5	(12^-)	3434.5	(10^-)			A_2=+0.32 *5*, A_4=−0.05 *7*.
651.5 *2*	1.9 *2*	2011.9	5^+	1360.4	$3^{(+)}$			A_2=+0.10 *4*, A_4=−0.02 *7*.
655.5 *2*	2.7[@] *4*	1544.1		888.6				
671.8 *2*	1.7 *2*	3066.5	9^-	2394.7	8^+			A_2=−0.27 *5*, A_4=−0.08 *9*.
685.5 *2*	1.7 *2*	2229.6		1544.1				
691.1 *2*	61.1 *4*	1592.4	6^+	901.4	4^+	E2		α(K)exp=0.0029 *5* A_2=+0.265 *7*, A_4=−0.06 *1*.
695.1 *2*	12.4 *2*	4353.6	(13^-)	3658.5	11^-	(E2)		A_2=+0.27 *1*, A_4=−0.02 *2*.
698.7 *2*	5.0 *3*	2799.3	(8^+)	2100.7	(6^+)			A_2=+0.25 *2*, A_4=+0.01 *3*.
729.7 *2*	6.6 *3*	3989.2	12^+	3259.5	10^+	E2		α(K)exp=0.0038 *6* A_2=+0.23 *2*, A_4=−0.03 *3*.
745.2 *2*	1.4 *2*	2927.7		2182.5				
793.7 *2*	4.2[@] *5*	4782.9	(14^+)	3989.2	12^+			A_2=+0.25 *4*, A_4=−0.03 *7*.
794.2 *2*	2.3[@] *5*	5679.1	(16^+)	4884.9	(14^+)			
801.4 *2*	3.5[@] *8*	4878.9	(14^-)	4077.5	(12^-)			A_2=+0.36 *2*, A_4=−0.03 *3*.
801.4 *2*	5.4[@] *8*	5155.0	(15^-)	4353.6	(13^-)	(E2)		A_2=+0.36 *2*, A_4=−0.03 *3*.
802.3 *2*	28.9[@] *5*	2394.7	8^+	1592.4	6^+	E2		α(K)exp=0.0021 *4* A_2=+0.292 *8*, A_4=−0.06 *1*.
802.8 *2*	3.0[@] *9*	3602.1	(10^+)	2799.3	(8^+)			
864.8 *2*	19.6 *3*	3259.5	10^+	2394.7	8^+	E2		α(K)exp=0.0021 *4* A_2=+0.33 *1*, A_4=−0.08 *2*.
881.8 *2*	1.0[@] *3*	6036.8	(17^-)	5155.0	(15^-)			
882.3 *2*	10.5[@] *7*	2474.5	8^-	1592.4	6^+			

Continued on next page (footnotes at end of table)

^{120}Sn(^{13}C,3nγ),^{116}Cd(^{18}O,4nγ) 1985Su03,2000St07 (continued)

γ(^{130}Ba) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
887.3 *2*	1.2 *2*	5766.2	(16$^-$)	4878.9	(14$^-$)		
907.4 *2*	2.1 *2*	907.4	2$^{(+)}$	0.0	0$^+$		A_2=+0.25 *9*, A_4=+0.02 *4*.
936.0[&] *2*		6972.8		6036.8	(17$^-$)		
946.8 *2*	1.6 *2*	5729.7	(16$^+$)	4782.9	(14$^+$)		A_2=+0.24 *8*, A_4=−0.02 *14*.
962.4 *2*	5.2 *2*	4221.9	(12$^+$)	3259.5	10$^+$	(E2)	A_2=+0.22 *5*, A_4=−0.11 *9*.
975.3 *2*	16.5 *3*	2567.7	7$^-$	1592.4	6$^+$	E1	α(K)exp=0.0007 *1* A_2=−0.24 *1*, A_4=−0.01 *2*.
981.2 *2*	1.4 *2*	4403.7		3422.5	10$^+$		
996.2 *2*	4.0 *2*	4255.7	(12$^+$)	3259.5	10$^+$		A_2=+0.31 *10*, A_4=−0.06 *16*.
1003.2 *2*	1.4 *2*	1360.4	3$^{(+)}$	357.1	2$^+$	D+Q	A_2=+0.08 *6*, A_4=+0.09 *9*.
1027.3 *2*	0.7[@] *3*	6757.0	(18$^+$)	5729.7	(16$^+$)		
1027.8 *2*	4.3[@] *5*	3422.5	10$^+$	2394.7	8$^+$		A_2=+0.36 *3*, A_4=−0.04 *5*.
1050.0[&] *2*		8022.8		6972.8			
1107.0 *2*	1.0 *2*	3289.5		2182.5			
1110.4 *2*	1.8 *2*	2011.9	5$^+$	901.4	4$^+$		A_2=+0.16 *12*, A_4=0.15 *19*.
1119.8 *2*	3.9 *3*	1476.9	(4$^+$)	357.1	2$^+$		A_2=+0.24 *4*, A_4=−0.07 *9*.
1199.3 *2*	1.7 *2*	2100.7	(6$^+$)	901.4	4$^+$		A_2=+0.33 *5*, A_4=−0.07 *9*.
1207.4 *2*	2.2 *2*	3602.1	(10$^+$)	2394.7	8$^+$		A_2=+0.33 *6*, A_4=−0.006 *9*.
1266.6 *2*	3.7 *2*	2167.9	5$^-$	901.4	4$^+$	D(+Q)	A_2=−0.21 *4*, A_4=−0.05 *6*.

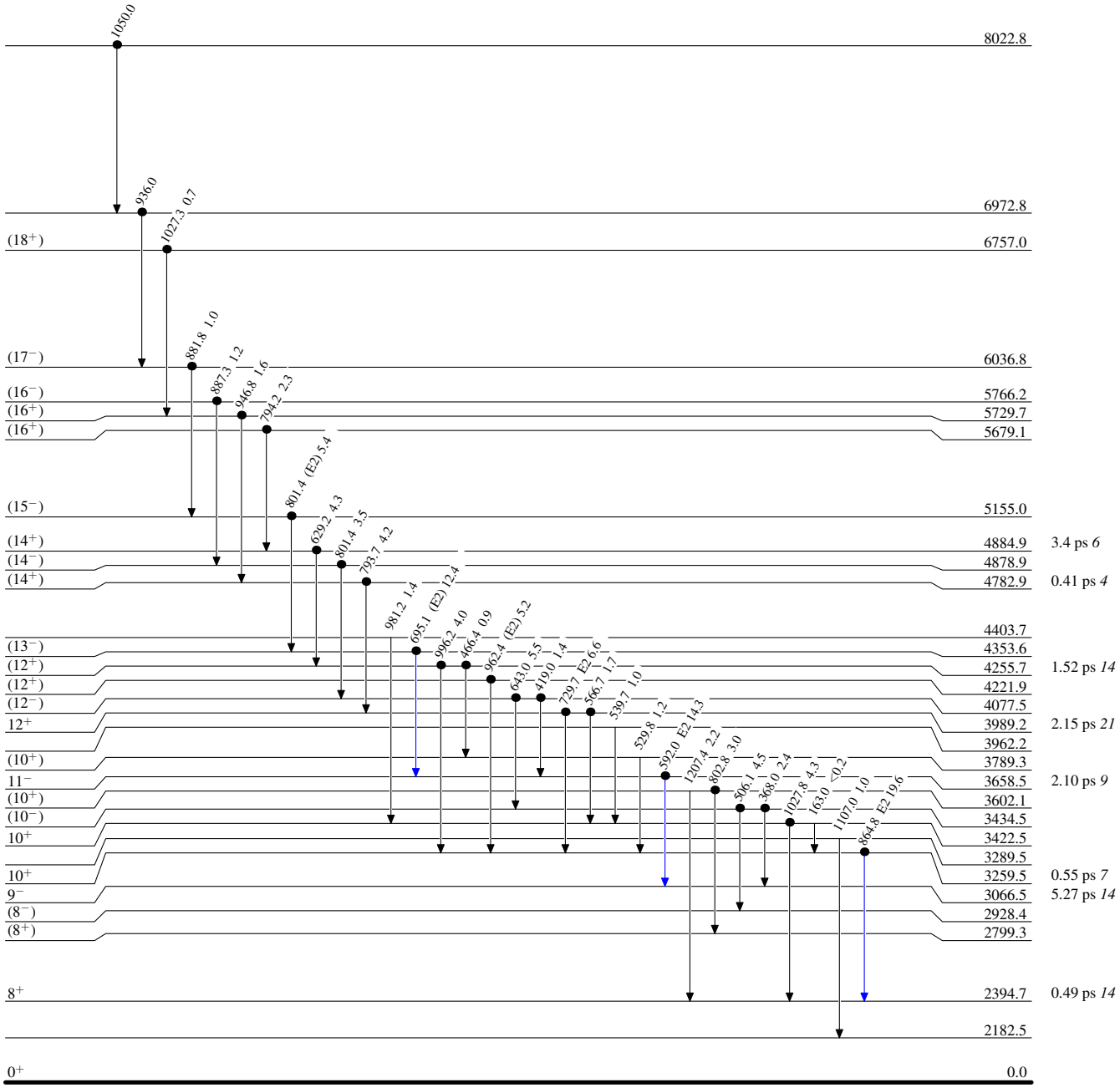
[†] From (^{13}C,3nγ) (1985Su03); Δ(Eγ)=0.2 keV assigned (evaluator).
[‡] From (^{13}C,3nγ) (1985Su03) at 52 MeV.
[#] From $\gamma(\theta)$ and α(K)exp.
[@] From $\gamma\gamma$ coin; component of a doublet.
[&] From 2000St07.
[a] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

^{120}Sn(^{13}C,3nγ),^{116}Cd(^{18}O,4nγ) 1985Su03,2000St07

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

Level Scheme

Intensities: Relative I_γ



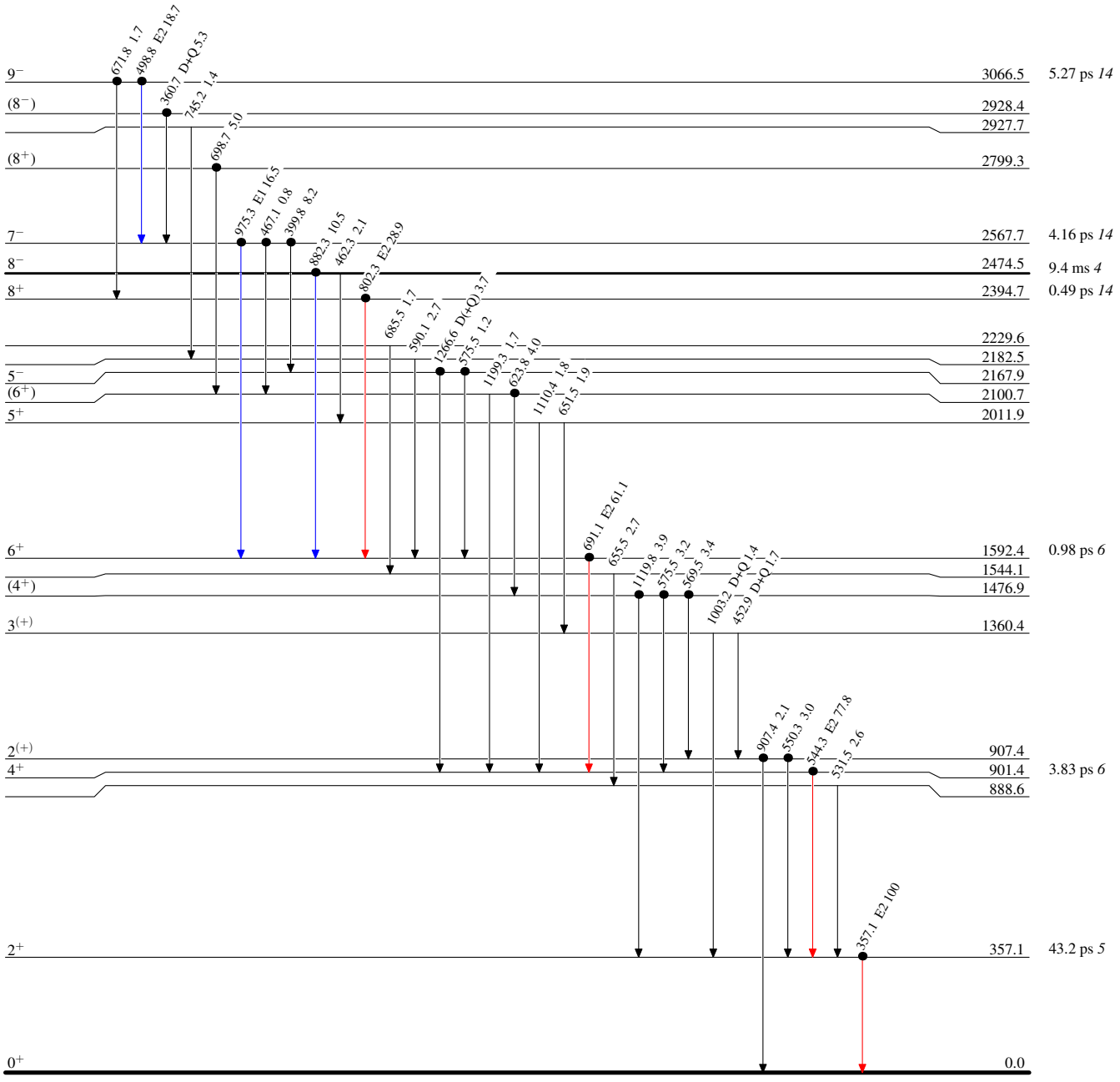
$^{130}_{56}Ba_{74}$

^{120}Sn(^{13}C,3nγ),^{116}Cd(^{18}O,4nγ) 1985Su03,2000St07

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

Level Scheme (continued)

Intensities: Relative I_γ



$^{130}_{56}Ba_{74}$

^{120}Sn(^{13}C,3nγ),^{116}Cd(^{18}O,4nγ) 1985Su03,2000St07