^{120}Sn(^{37}Cl,4nγ):SD 1997Ap02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 170, 1 (2020)	16-Aug-2020

^{120}Sn(^{37}Cl,4nγ) at 177 MeV with γ measured in Ge detector (Eurogam II) array. 1997Ap05 is superseded by 1997Ap02.
Superdeformed bands assigned to ^{153}Ho on basis of coincidences with γ's assigned to low-lying normal-deformed levels and on population intensities relative to those in normal-deformed channels.

^{153}Ho Levels

The population intensity of the SD-1 band relative to that of the 913 γ ($35/2^+$ at 3687 keV to $31/2^+$ normal-band transition) feeding the 229-ns isomer at 2772 keV is ≈ 0.4%; population intensity for SD-2 band is 30% *5* of SD-1 band, and population intensity of SD-3band is also 30% *5* of SD-1 band.

E(level)[†]	J$^\pi$[#]	Comments
x[&]	J	J$^\pi$: J ≈ $51/2^-$.
x+651.3[&] *14*	J+2	
x+1347.1[&] *8*	J+4	
x+2087.1[‡&]	J+6	
x+2871.1[&] *2*	J+8	
x+3701.7[&] *5*	J+10	
x+4577.3[&] *6*	J+12	
x+5499.6[&] *7*	J+14	
x+6469.1[&] *8*	J+16	
x+7484.0[&] *10*	J+18	
x+8543.9[&] *10*	J+20	
x+9647.0[&] *11*	J+22	
x+10791.4[&] *11*	J+24	
x+11971.7[&] *12*	J+26	
x+13187.2[&] *12*	J+28	
x+14438.3[&] *12*	J+30	
x+15733.5[&] *14*	J+32	
x+17076[&] *2*	J+34	
x+18466[&] *2*	J+36	
y[a]	J1	J$^\pi$: J_1 ≈ $(57/2^-)$.
y+713[a] *2*	J1+2	
y+1474.0[‡a]	J1+4	
y+2282.4[a] *3*	J1+6	
y+3136.5[a] *4*	J1+8	
y+4036.8[a] *5*	J1+10	
y+4983.4[a] *6*	J1+12	
y+5976.5[a] *8*	J1+14	
y+7017.8[a] *9*	J1+16	
y+8105.4[a] *10*	J1+18	
y+9239.1[a] *11*	J1+20	
y+10421.4[a] *12*	J1+22	
y+11651.0[a] *12*	J1+24	
y+12929.4[a] *13*	J1+26	
y+14255.6[a] *13*	J1+28	

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^{120}Sn(^{37}Cl,4nγ):SD 1997Ap02 (continued)

^{153}Ho Levels (continued)

E(level)[†]	J$^{\pi}$[#]	Comments
y+15632.6[a] *14*	J1+30	
y+17058[a] *2*	J1+32	
z[b]	J2	J$^{\pi}$: J$_2$ ≈ (49/2$^-$).
z+657.0[b] *9*	J2+2	
z+1340.3[b] *5*	J2+4	
z+2066.6[‡b]	J2+6	
z+2837.4[b] *3*	J2+8	
z+3653.7[b] *4*	J2+10	
z+4515.0[b] *5*	J2+12	
z+5421.9[b] *7*	J2+14	
z+6375.2[b] *8*	J2+16	
z+7371.6[b] *9*	J2+18	
z+8417.7[b] *10*	J2+20	
z+9510.4[b] *11*	J2+22	
z+10653.7[b] *12*	J2+24	
z+11848.6[b] *13*	J2+26	
z+13096.0[b] *16*	J2+28	
z+14393.4[b] *19*	J2+30[@]	
z+15744[b] *3*	J2+32[@]	

[†] Since the energies of the γ rays at the bottom of the SD bands are not the most precise values in the bands, and in fact some of these γ's are only tentatively placed, the uncertainties in the level energies are computed relative to the third or fourth member of each band.

[‡] Taken as reference energy for this band for relative uncertainty assignment.

[#] Assigned by authors and assigned relative to the spins of the yrast SD band in ^{152}Dy. Configurations in the bands are discussed in detail in 1997Ap02.

[@] Based on assignment of 657 γ as 53/2$^-$ to 49/2$^-$ transition, the 1351 γ should be assigned as a 113/2$^-$ to 109/2$^-$ transition, not 117/2$^-$ to 113/2$^-$ transition as assigned by 1997Ap02.

[&] Band(A): SD-1 band (1997Ap02). Configuration=$\pi 6^4 \nu 7^2 \otimes(\pi 1/2[530])$, α=−1/2 at lower frequencies and $\pi 6^4 \nu 7^2$ (π1/2[770]), α=−1/2 at higher frequencies. The crossing of 1/2[770] proton orbital occurs at $\hbar\omega \approx 0.6$ MeV (1997Ap02). $\pi 6^4 \nu 7^2$ is the configuration assigned to the yrast SD band in ^{152}Dy.

[a] Band(B): SD-2 band (1997Ap02). Configuration=$\pi 6^4 \nu 7^2 \otimes(\pi 1/2[530])$, α=+1/2; signature partner of SD-1 band (1997Ap02).

[b] Band(C): SD-3 band (1997Ap02). Configuration=$\pi 6^4 \nu 7^2 \otimes(\pi 7/2[523])$, α=+1/2 (1997Ap02).

γ(^{153}Ho)

E$_\gamma$	I$_\gamma$[†]	E$_i$(level)	J$_i^{\pi}$	E$_f$	J$_f^{\pi}$	Mult.[‡]	Comments
651.3 *19*	0.44 *5*	x+651.3	J+2	x	J		
657[#] *2*		z+657.0	J2+2	z	J2		
683.3 *7*	0.28 *5*	z+1340.3	J2+4	z+657.0	J2+2		
695.8 *11*	0.75 *8*	x+1347.1	J+4	x+651.3	J+2	(E2)	R(asymmetry)=1.5 *4*.
713[#] *2*		y+713	J1+2	y	J1		
726.3 *5*		z+2066.6	J2+6	z+1340.3	J2+4		
740.0 *8*	0.95 *8*	x+2087.1	J+6	x+1347.1	J+4	(E2)	R(asymmetry)=1.3 *3*.
761[#] *2*		y+1474.0	J1+4	y+713	J1+2		

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^{120}Sn(^{37}Cl,4nγ):SD 1997Ap02 (continued)

$\gamma(^{153}Ho)$ (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
770.8 *3*	0.25 *5*	z+2837.4	J2+8	z+2066.6	J2+6		
784.0 *2*	0.99 *8*	x+2871.1	J+8	x+2087.1	J+6	(E2)	R(asymmetry)=1.4 *4*.
808.4 *3*	0.12 *3*	y+2282.4	J1+6	y+1474.0	J1+4		
816.3 *3*	0.29 *5*	z+3653.7	J2+10	z+2837.4	J2+8		
830.6 *5*		x+3701.7	J+10	x+2871.1	J+8		
854.1 *3*	0.22 *3*	y+3136.5	J1+8	y+2282.4	J1+6		
861.3 *3*	0.30 *6*	z+4515.0	J2+12	z+3653.7	J2+10		
875.6 *3*	0.97 *10*	x+4577.3	J+12	x+3701.7	J+10	(E2)	R(asymmetry)=1.3 *2*.
900.3 *3*	0.38 *7*	y+4036.8	J1+10	y+3136.5	J1+8		
906.9 *5*		z+5421.9	J2+14	z+4515.0	J2+12		
922.3 *3*	1.06 *9*	x+5499.6	J+14	x+4577.3	J+12		
946.6 *3*	0.29 *6*	y+4983.4	J1+12	y+4036.8	J1+10		
953.3 *3*	0.27 *5*	z+6375.2	J2+16	z+5421.9	J2+14		
969.5 *5*	0.89 *9*	x+6469.1	J+16	x+5499.6	J+14	(E2)	R(asymmetry)=1.3 *3*.
993.1 *5*		y+5976.5	J1+14	y+4983.4	J1+12		
996.4 *5*		z+7371.6	J2+18	z+6375.2	J2+16		
1014.9 *5*	0.92 *8*	x+7484.0	J+18	x+6469.1	J+16	(E2)	R(asymmetry)=1.4 *3*.
1041.3 *5*		y+7017.8	J1+16	y+5976.5	J1+14		
1046.1 *4*	0.20 *4*	z+8417.7	J2+20	z+7371.6	J2+18		
1059.9 *3*	0.60 *10*	x+8543.9	J+20	x+7484.0	J+18	(E2)	R(asymmetry)=1.6 *6*.
1087.6 *3*	0.31 *6*	y+8105.4	J1+18	y+7017.8	J1+16		
1092.7 *3*	0.21 *4*	z+9510.4	J2+22	z+8417.7	J2+20		
1103.1 *3*	0.71 *10*	x+9647.0	J+22	x+8543.9	J+20		
1133.7 *6*	0.28 *5*	y+9239.1	J1+20	y+8105.4	J1+18		
1143.3 *5*	0.19 *4*	z+10653.7	J2+24	z+9510.4	J2+22		
1144.4 *3*	0.41 *7*	x+10791.4	J+24	x+9647.0	J+22		
1180.3 *3*	0.52 *8*	x+11971.7	J+26	x+10791.4	J+24		
1182.3 *3*	0.28 *5*	y+10421.4	J1+22	y+9239.1	J1+20		
1194.9 *5*		z+11848.6	J2+26	z+10653.7	J2+24		
1215.5 *3*	0.27 *6*	x+13187.2	J+28	x+11971.7	J+26		
1229.6 *3*	0.25 *5*	y+11651.0	J1+24	y+10421.4	J1+22		
1247.4 *10*	0.15 *3*	z+13096.0	J2+28	z+11848.6	J2+26		
1251.1 *3*	0.27 *5*	x+14438.3	J+30	x+13187.2	J+28		
1278.4 *4*	0.21 *4*	y+12929.4	J1+26	y+11651.0	J1+24		
1295.2 *6*		x+15733.5	J+32	x+14438.3	J+30		
1297.4 *19*	0.10 *3*	z+14393.4	J2+30	z+13096.0	J2+28		
1326.2 *4*	0.07 *3*	y+14255.6	J1+28	y+12929.4	J1+26		
1343[#] *1*		x+17076	J+34	x+15733.5	J+32		
1351 *2*		z+15744	J2+32	z+14393.4	J2+30		I_γ: 0.32 *9* (scaled value=0.10 *3*) given by 1997Ap02 is the same as that for 1297.4 γ. It is probably a misprint since such a peak is not apparent in figure 1 of 1997Ap02.
1377.0 *4*		y+15632.6	J1+30	y+14255.6	J1+28		
1390[#] *1*		x+18466	J+36	x+17076	J+34		
1425[#] *2*		y+17058	J1+32	y+15632.6	J1+30		

[†] The authors' Iγ for the first band have been quoted here. For the other two bands, the authors' tabulated values have been scaled by their relative band intensities of 0.30 *5* and 0.30 *5* so that all of the values given here are on the same scale.

[‡] R(asymmetry)=Iγ(forward+backward)/Iγ(90°)=1.49 *15* is consistent with stretched quadrupole transition and the quadrupole transitions are assumed to be E2.

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

^{120}Sn(^{37}Cl,4nγ):SD 1997Ap02

Level Scheme

Intensities: Relative I_γ

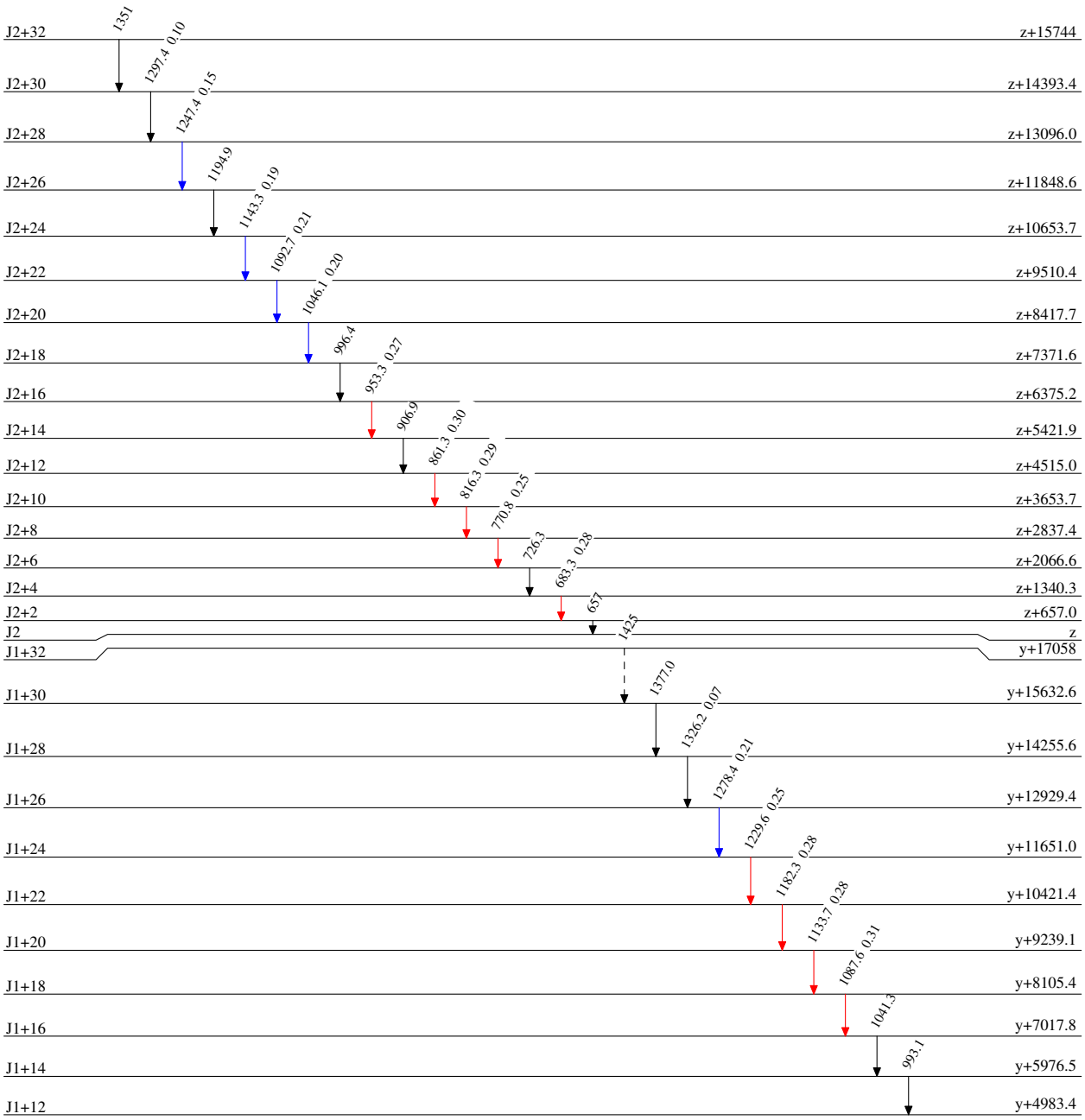
Legend

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

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

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

γ Decay (Uncertain)



$^{153}_{67}Ho_{86}$

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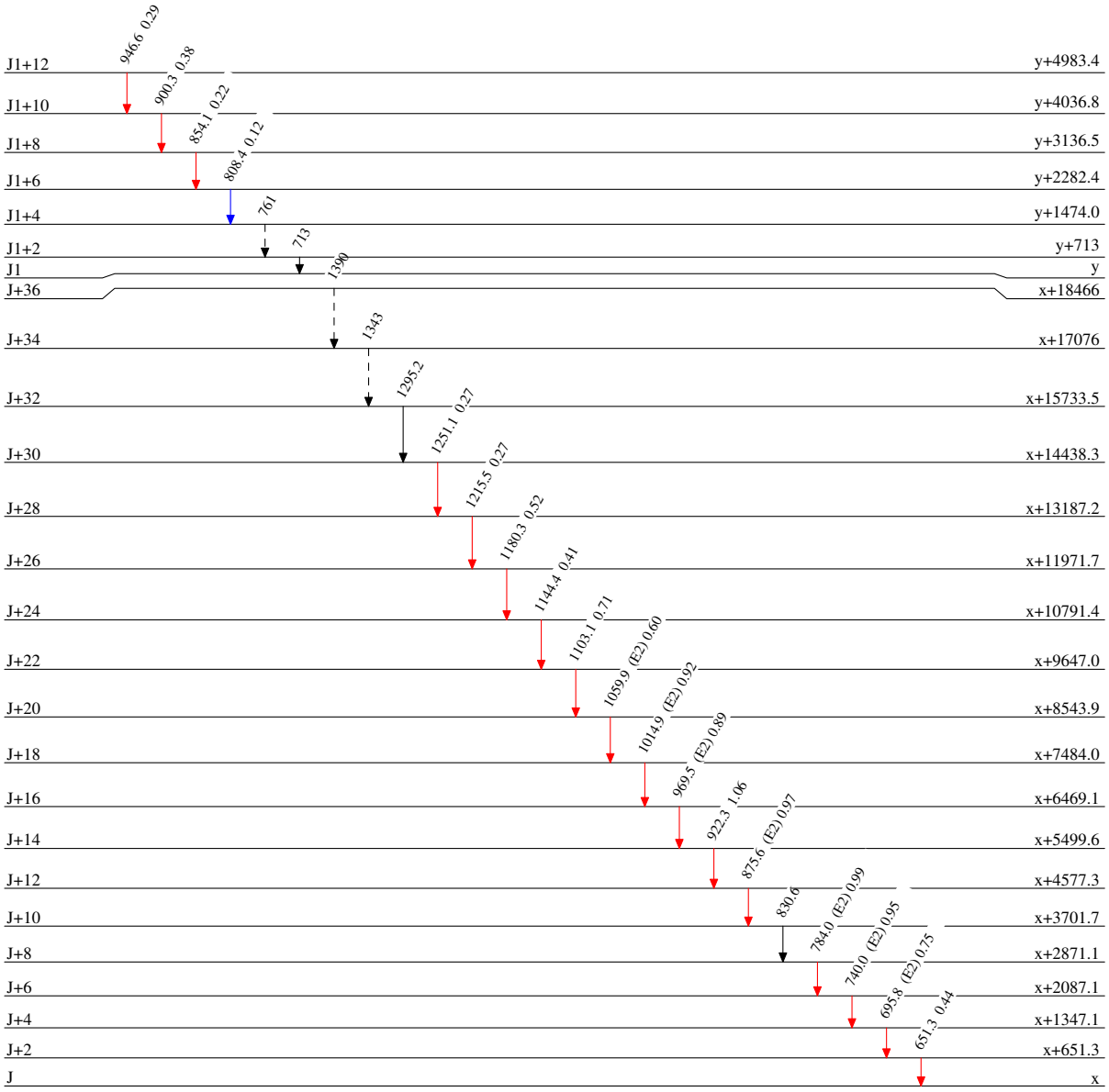
Level Scheme (continued)

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)



$^{153}_{67}Ho_{86}$

^{120}Sn(^{37}Cl,4nγ):SD 1997Ap02