(HI,xnγ):superdeformed bands

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, I. Mitropolsky, A. Rodionov	NDS 107, 2715 (2006)	17-Jul-2006

1988Lu01: ^{100}Mo(^{36}S,5nγ), E=150 MeV; ^{98}Mo(^{36}S,3nγ), E=155 MeV. SD-1 band deduced, the intensity ≈5% of the total in ^{131}Ce. POLITESSA array.
1989LaZY: ^{98}Mo(^{36}S,3nγ), E=143, 150 MeV. Deduced Q_0 for SD-1 band, DSA method.
1990He12: ^{100}Mo(^{36}S,5nγ), E=155 MeV. Deduced Q_0, β_2 for SD-1 band. TESSA3 array, DSA method.
1993Pa02: ^{104}Ru(^{32}S,α3nγ), E=160 MeV. Deduced SD-1 band. EUROGAM array.
1998Pe01: ^{110}Pd(^{28}Si,α3nγ), E=132 MeV. Deduced Q_0 for SD-1 band. GASP array, DSA method.
1993Mu09: ^{117}Sn(^{18}O,4nγ), E=84 MeV. Deduced Q_0 for SD-1 band. NORDBALL array, DSA method.
1987Be32, 1987Wa18: ^{98}Mo(^{40}Ar,α3nγ), E=173 MeV, ^{104}Ru(^{34}S,α3nγ), E=155 MeV. The SD band was assigned incorrectly to ^{134}Nd through 4n channel (see 1993Pa02; also 1982No02,1990HeZD,1992Ha35).
1996Se03,1996Se04,1996Cl03: ^{100}Mo(^{36}S,5nγ), E=155 MeV. Deduced excited SD-1 and SD-2 bands, Q_0 for the bands. GAMMASPHERE and EUROGAM arrays, DSA method.
1998Wi13: ^{100}Mo(^{36}S,5nγ), E=135, 142, 150, 155, 160, 170 MeV. Measured intensity of SD band populations.
2005Pa30: ^{100}Mo(^{36}S,5nγ), E=160, 165 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$ of SD band transitions using EUROBALL IV spectrometer, deduced two SD bands linked together; the measured energies of γ-rays are higher systematically (1-8 keV) as compared to other measurements.

^{131}Ce Levels

All data from 2005Pa30 as they are more complete compared to others, except as noted.

E(level)†	J$^\pi$‡	Comments
y#	(29/2$^+$)	Additional information 1. J$^\pi$: (29/2$^+$) (2005Pa30). J=17/2 suggested by 1988Lu01 and 21/2 by 1991Pa07, based on feeding of normal states of J^π=15/2 to 21/2. However, J^π≈29/2 is more likely from a comparison of experimental angular frequencies with J^π's of normal states and the SD bands of neighboring nuclides.
591.50+y# *10*	(33/2$^+$)	Additional information 2.
1253.60+y# *10*	(37/2$^+$)	
1986.90+y# *15*	(41/2$^+$)	
2791.98+y# *18*	(45/2$^+$)	
3509.9+y@ *4*	(43/2$^+$)	
3666.88+y# *20*	(49/2$^+$)	
4305.5+y@ *4*	(47/2$^+$)	
4610.89+y# *23*	(53/2$^+$)	
5152.9+y@ *4*	(51/2$^+$)	
5623.39+y# *25*	(57/2$^+$)	
6061.5+y@ *4*	(55/2$^+$)	
6705.2+y# *3*	(61/2$^+$)	
7038.2+y@ *4*	(59/2$^+$)	
7858.1+y# *3*	(65/2$^+$)	
8083.2+y@ *4*	(63/2$^+$)	
9084.8+y# *3*	(69/2$^+$)	
9196.3+y@ *4*	(67/2$^+$)	
10379.2+y@ *4*	(71/2$^+$)	
10388.2+y# *4*	(73/2$^+$)	

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(HI,xnγ):superdeformed bands (continued)

^{131}Ce Levels (continued)

E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]
11632.1+y[@] *5*	(75/2$^+$)	16434.8+y[#] *5*	(89/2$^+$)	22556+y[@] *3*	(103/2$^+$)
11771.5+y[#] *4*	(77/2$^+$)	17382.5+y[@] *5*	(91/2$^+$)	23937.1+y[#] *7*	(105/2$^+$)
12956.5+y[@] *5*	(79/2$^+$)	18170.6+y[#] *5*	(93/2$^+$)	24461+y[@] *3*	(107/2$^+$)
13238.1+y[#] *4*	(81/2$^+$)	19019.1+y[@] *5*	(95/2$^+$)	26045.5+y[#] *8*	(109/2$^+$)
14354.6+y[@] *5*	(83/2$^+$)	20001.1+y[#] *6*	(97/2$^+$)	26461+y[@] *3*	(111/2$^+$)
14791.5+y[#] *4*	(85/2$^+$)	20743+y[@] *3*	(99/2$^+$)	28556+y[@] *3*	(115/2$^+$)
15828.6+y[@] *5*	(87/2$^+$)	21926.1+y[#] *7*	(101/2$^+$)		

[†] From least-squares fit to Eγ's.

[‡] From γ mult. and Cranked-shell model calculations.

[#] Band(A): SD-1 band (1988Lu01,1990He12,1993Mu09,1993Pa02,1996Se04, 1988Lu01,1987Be32,1993Pa02,2005Pa30). Probable configuration= $\pi 5^4 \nu 6^1$ (1996Se03,1996Se04). Q(intrinsic)=7.3 *4*, β_2=0.38 *2* (1998Pe01); β_2=0.36 *2* from Q (1994WaZV). Others: Q_0=7.4 *3* (1996Di03,1996Cl03), 5.5 *5* (1993Mu09), 6.4 (1994WaZV), ≈6.0 (1990He12). Percent population=2.0 to 7.0 depending on projectile energy (1998Wi13); =5 (2005Pa30). The SD band previously assigned (1987Be32,1987Wa18) to ^{134}Nd is now assigned to ^{131}Ce (1993Pa02).

[@] Band(B): SD-2 band (1996Se03,2005Pa30). Probable configuration=$\pi 5^4 \nu 6^2$ (1996Cl03). This involves excitation of a neutron from 1/2[411]α=+1/2 orbital to 1/2[660]α=−1/2 orbital (1996Cl03,1996Se03). Q(intrinsic)=8.5 *4* (1996Se03,1996Cl03), *2* ≈0.43 (1996Se03). Percent population=1.0 to 1.7 (1998Wi13) β^-depending on projectile energy; =1 (2005Pa30).

γ(^{131}Ce)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
591.5 *1*	0.38 *2*	591.50+y	(33/2$^+$)	y	(29/2$^+$)	E2	E_γ: 590.73 5 (1996Se04).
662.1 *1*	0.79 *2*	1253.60+y	(37/2$^+$)	591.50+y	(33/2$^+$)	E2	DCO=0.9 *2*. E_γ: 661.99 *5* (1996Se04).
733.3 *1*	0.84 *2*	1986.90+y	(41/2$^+$)	1253.60+y	(37/2$^+$)	E2	DCO=1.0 *2*. E_γ: 732.52 *5* (1996Se04).
788[@]		3509.9+y	(43/2$^+$)				The transition populates an unspecified states.
795.5 *1*	0.62 *2*	4305.5+y	(47/2$^+$)	3509.9+y	(43/2$^+$)	E2	DCO=0.8 *2*.
805.1 *1*	1.00	2791.98+y	(45/2$^+$)	1986.90+y	(41/2$^+$)	E2	DCO=0.9 *2*. E_γ: 804.27 *5* (1996Se04).
847.4 *1*	0.96 *2*	5152.9+y	(51/2$^+$)	4305.5+y	(47/2$^+$)	E2	DCO=0.8 *2*. E_γ: 846.8 *1* (1996Se03).
874.9 *1*	0.96 *2*	3666.88+y	(49/2$^+$)	2791.98+y	(45/2$^+$)	E2	DCO=0.8 *2*. E_γ: 873.95 *5* (1996Se04).
908.6 *1*	0.90 *2*	6061.5+y	(55/2$^+$)	5152.9+y	(51/2$^+$)	E2	DCO=1.0 *2*. E_γ: 908.07 *10* (1996Se03).
944.0 *1*	0.96 *2*	4610.89+y	(53/2$^+$)	3666.88+y	(49/2$^+$)	E2	DCO=0.9 *2*. E_γ: 942.93 *5* (1996Se04).
976.7 *1*	1.00	7038.2+y	(59/2$^+$)	6061.5+y	(55/2$^+$)	E2	DCO=1.0 *2*. E_γ: 975.52 *10* (1996Se03).
1012.5 *1*	0.93 *2*	5623.39+y	(57/2$^+$)	4610.89+y	(53/2$^+$)	E2	DCO=0.8 *2*. E_γ: 1011.33 *5* (1996Se04).
1045.0 *1*	0.89 *2*	8083.2+y	(63/2$^+$)	7038.2+y	(59/2$^+$)	E2	DCO=0.8 *2*. E_γ: 1043.13 *10* (1996Se03).
1081.8 *1*	0.75 *2*	6705.2+y	(61/2$^+$)	5623.39+y	(57/2$^+$)	E2	DCO=1.0 *2*. E_γ: 1080.48 *6* (1996Se04).
1113.1 *1*	0.79 *2*	9196.3+y	(67/2$^+$)	8083.2+y	(63/2$^+$)	E2	DCO=1.2 *2*. E_γ: 1112.24 *11* (1996Se03).

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(HI,xnγ):superdeformed bands (continued)

γ(^{131}Ce) (continued)

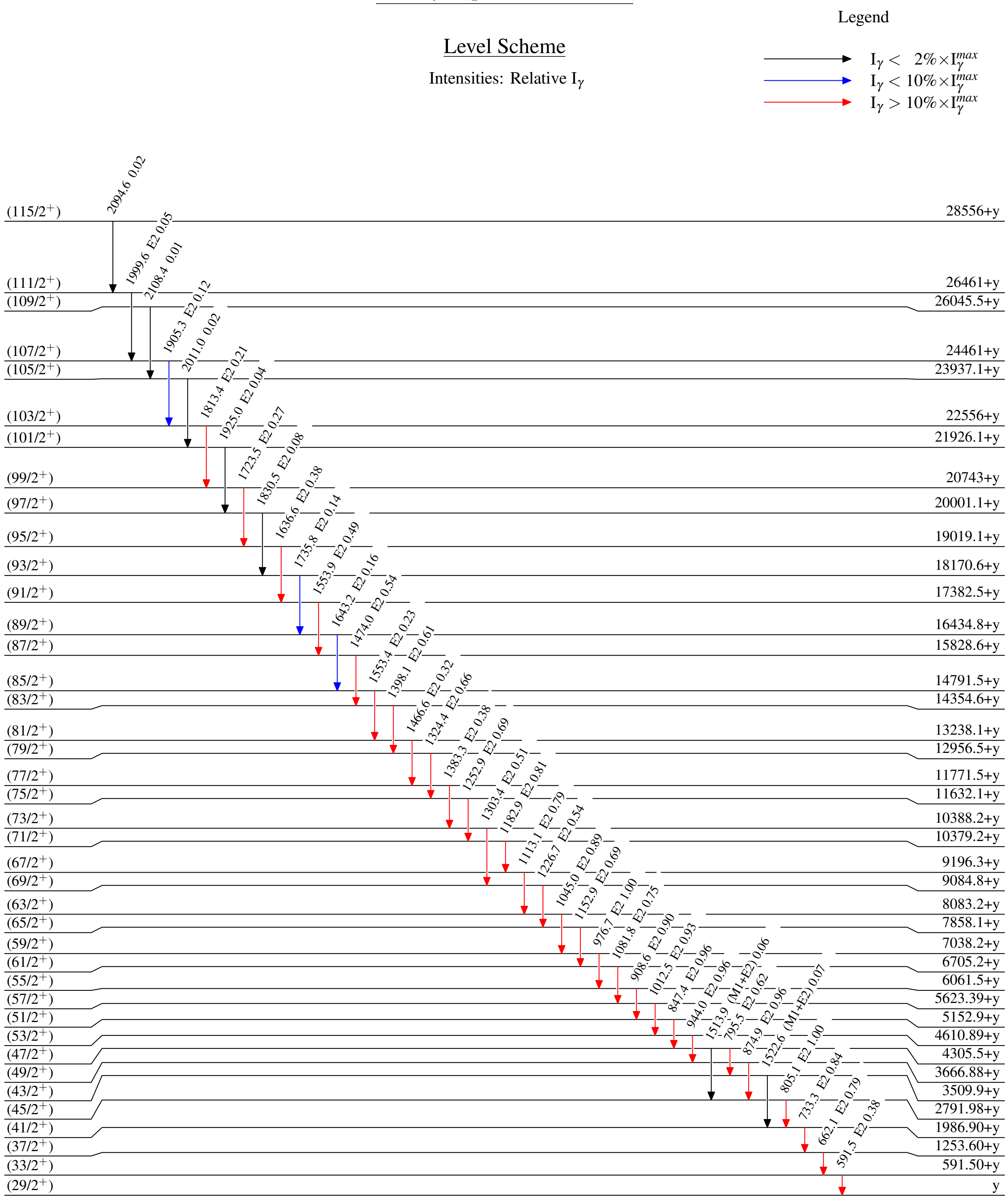
E_γ†	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	Comments
1152.9 *1*	0.69 *2*	7858.1+y	(65/2+)	6705.2+y	(61/2+)	E2	DCO=0.9 *2*. E_γ: 1151.28 *6* (1996Se04).
1182.9 *1*	0.81 *2*	10379.2+y	(71/2+)	9196.3+y	(67/2+)	E2	DCO=1.3 *2*. E_γ: 1181.28 *12* (1996Se03).
1226.7 *1*	0.54 *2*	9084.8+y	(69/2+)	7858.1+y	(65/2+)	E2	DCO=1.1 *2*. E_γ: 1225.00 *6* (1996Se04).
1252.9 *1*	0.69 *2*	11632.1+y	(75/2+)	10379.2+y	(71/2+)	E2	DCO=1.1 *2*. E_γ: 1250.71 *12* (1996Se03).
1303.4 *1*	0.51 *2*	10388.2+y	(73/2+)	9084.8+y	(69/2+)	E2	DCO=1.1 *2*. E_γ: 1301.38 *6* (1996Se04).
1324.4 *1*	0.66 *2*	12956.5+y	(79/2+)	11632.1+y	(75/2+)	E2	DCO=1.1 *2*. E_γ: 1322.04 *12* (1996Se03).
1383.3 *1*	0.38 *2*	11771.5+y	(77/2+)	10388.2+y	(73/2+)	E2	DCO=1.1 *2*. E_γ: 1381.11 *8* (1996Se04).
1398.1 *1*	0.61 *2*	14354.6+y	(83/2+)	12956.5+y	(79/2+)	E2	DCO=1.1 *2*. E_γ: 1396.22 *15* (1996Se03).
1466.6 *1*	0.32 *2*	13238.1+y	(81/2+)	11771.5+y	(77/2+)	E2	DCO=1.1 *2*. E_γ: 1464.06 *8* (1996Se04).
1474.0 *1*	0.54 *2*	15828.6+y	(87/2+)	14354.6+y	(83/2+)	E2	DCO=1.0 *2*. E_γ: 1470.66 *15* (1996Se03).
1513.9 *4*	0.06 *1*	4305.5+y	(47/2+)	2791.98+y	(45/2+)	(M1+E2)	DCO=1.9 *4*.
1522.6 *4*	0.07 *1*	3509.9+y	(43/2+)	1986.90+y	(41/2+)	(M1+E2)	DCO=1.9 *3*.
1553.4 *1*	0.23 *2*	14791.5+y	(85/2+)	13238.1+y	(81/2+)	E2	DCO=1.2 *2*. E_γ: 1549.89 *10* (1996Se04).
1553.9 *2*	0.49 *2*	17382.5+y	(91/2+)	15828.6+y	(87/2+)	E2	DCO=1.1 *2*. E_γ: 1551.81 *19* (1996Se03).
1636.6 *1*	0.38 *2*	19019.1+y	(95/2+)	17382.5+y	(91/2+)	E2	DCO=1.2 *2*. E_γ: 1634.80 *20* (1996Se03).
1643.2 *2*	0.16 *1*	16434.8+y	(89/2+)	14791.5+y	(85/2+)	E2	DCO=1.2 *2*. E_γ: 1640.26 *12* (1996Se04).
1723.5 *25*	0.27 *2*	20743+y	(99/2+)	19019.1+y	(95/2+)	E2	DCO=1.1 *2*. E_γ: 1723.02 *25* (1996Se04).
1735.8 *2*	0.14 *1*	18170.6+y	(93/2+)	16434.8+y	(89/2+)	E2	DCO=1.0 *2*. E_γ: 1731.50 *15* (1996Se04).
1813.4 *3*	0.21 *2*	22556+y	(103/2+)	20743+y	(99/2+)	E2	DCO=1.1 *2*.
1830.5 *3*	0.08 *1*	20001.1+y	(97/2+)	18170.6+y	(93/2+)	E2	DCO=1.0 *2*. E_γ: 1822.0 *3* (1996Se04).
1905.3 *3*	0.12 *2*	24461+y	(107/2+)	22556+y	(103/2+)	E2	DCO=1.3 *3*.
1925.0 *3*	0.04 *1*	21926.1+y	(101/2+)	20001.1+y	(97/2+)	E2	DCO=1.0 *3*.
1999.6 *4*	0.05 *1*	26461+y	(111/2+)	24461+y	(107/2+)	E2	DCO=0.8 *3*.
2011.0 *3*	0.02 *1*	23937.1+y	(105/2+)	21926.1+y	(101/2+)		
2094.6 *5*	0.02 *1*	28556+y	(115/2+)	26461+y	(111/2+)		
2108.4 *4*	0.01 *1*	26045.5+y	(109/2+)	23937.1+y	(105/2+)		

† From 2005Pa30, Eγ values are discrepant from 1988Lu01, 1996Se03 and 1996Se04 within 1-8.5 keV.
‡ From 2005Pa30.
# From angular intensity ratio DCO=I(γγ)(measured at 158°, gated at 90°)/I(γγ)(measured at 90°, gated at 158°) values of ≈1.0 are expected for ΔJ=2, a stretched E2 transition, and of ≈0.65 for ΔJ=1, pure stretched dipole transitions. Two linking transitions have R values of ≈ 1.9, and rather imply mixed M1+E2 ΔJ=1 character with large δ>0 (2005Pa30).
@ Placement of transition in the level scheme is uncertain.

(HI,xnγ):superdeformed bands

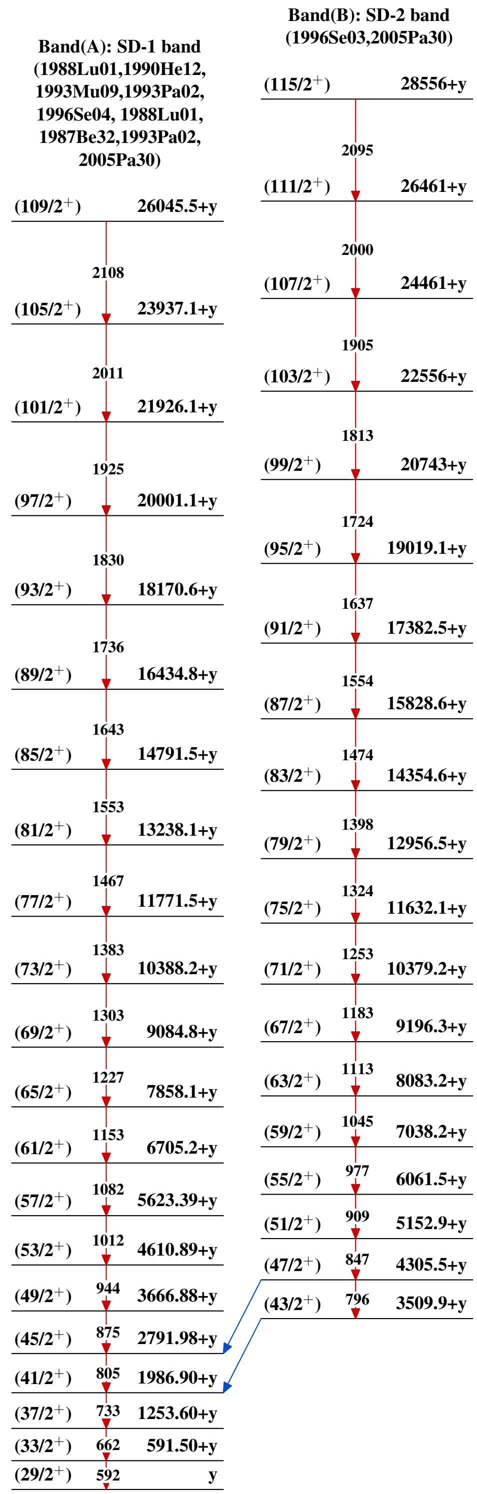
Level Scheme

Intensities: Relative I_γ



$^{131}_{58}Ce_{73}$

(HI,xnγ):superdeformed bands



$^{131}_{58}Ce_{73}$