^{100}Mo(^{36}S,4nγ):SD 2005Pa30,1995Sa21,1996Cl03

Type	Author	History Citation	Literature Cutoff Date
Update	Balraj Singh		03-Aug-2005

Additional information 1.

Includes ^{116}Cd(^{22}Ne,6nγ), ^{112}Cd(^{26}Mg,α2nγ), ^{110}Pd(^{26}Mg,4nγ), ^{64}Ni(^{74}Ge,α2nγ) reactions.

2005Pa30: E=160, 165 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$ of SD band transitions using EUROBALL IV spectrometer consisting of 15 seven-crystal 'Clusters', 30 single-crystal tapered detectors, and 26 four-crystal 'Clovers'. Each of the three sets of detectors with inner-ball sections of a total of 181 BGO detectors. Deduced three SD bands.

1995Sa21 (also 1996Se04): E=155 MeV. Measured Eγ, $\gamma\gamma$ using EUROGAM array; deduced excited SD bands. Precise gamma-ray energies for SD-1 band given by 1996Se04 from a re-analysis of data.

1996Cl03: E=155 MeV. Measured lifetimes by Doppler-shift attenuation method; $\gamma(\theta)$, $\gamma\gamma$. Deduced quadrupole moments.

1987Ki02, 1987WA18 (also 1988NoZY,1985No02): E=150 MeV. Measured Eγ, Iγ, lifetimes by DSAM; deduced SD bands, feeding pattern. 12 transitions in SD-1 band reported by 1985No02.

1995Ha28: ^{116}Cd(^{22}Ne,6nγ) E=120 MeV. measured $\gamma\gamma$, lifetimes by DSAM, centroid shifts; deduced quadrupole moment of yrast SD band.

Others:

1998Fa07: E=155 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$; deduced SD band quasicontinuum, rotational damping using EUROGAM array of 54 Ge detectors.

1998Wi13: E=135-170 MEV. Measured Eγ, Iγ, $\gamma\gamma$; deduced SD-1 band feeding pattern vs entrance channel spin and energy using 8π array of 20 Ge detectors and 70 BGO inner-ball detectors.

1997Ni04: ^{112}Cd(^{26}Mg,α2nγ) E=94 MeV and ^{64}Ni(^{74}Ge,α2nγ) E=239 MeV. Measured relative population of SD bands.

1994WaZV: ^{110}Pd(^{26}Mg,4nγ) E=130 MeV. Measured DSAM, Q.

^{132}Ce Levels

E(level)	J$^\pi$	$T_{1/2}$ ‡	Comments
y †#	J≈(20$^+$)		J$^\pi$: from 2005Pa30. Other: ≈(18) from 1987Ki02 for level fed by 809γ. E(level): y>4950 (1987Ki02).
770.80+y †# *10*	J+2		J$^\pi$: decay of this level predominantly feeds yrast 18$^+$ state In normal deformed band.
1580.10+y # *15*	J+4	59 fs *20*	$T_{1/2}$: apparent $T_{1/2}$=301 fs *35* (1987Ki02).
2445.81+y # *18*	J+6	62 fs *14*	$T_{1/2}$: apparent $T_{1/2}$=193 fs *9* (1987Ki02).
3375.41+y # *20*	J+8	28 fs *12*	$T_{1/2}$: apparent $T_{1/2}$=118 fs *11* (1987Ki02).
4371.31+y # *23*	J+10	<17 fs	$T_{1/2}$: apparent $T_{1/2}$=87 fs *11* (1987Ki02).
5433.02+y # *25*	J+12	<21 fs	$T_{1/2}$: apparent $T_{1/2}$=75 fs *6* (1987Ki02).
6561.8+y # *3*	J+14	14 fs *7*	$T_{1/2}$: apparent $T_{1/2}$=61 fs *5* (1987Ki02).
7758.2+y # *3*	J+16	10 fs *8*	$T_{1/2}$: apparent $T_{1/2}$=43 fs *4* (1987Ki02).
9023.8+y # *3*	J+18	<14 fs	$T_{1/2}$: apparent $T_{1/2}$=35 fs *4* (1987Ki02).
10360.6+y # *4*	J+20	<7 fs	$T_{1/2}$: apparent $T_{1/2}$=26 fs *4* (1987Ki02).
11771.4+y # *4*	J+22	<10 fs	$T_{1/2}$: apparent $T_{1/2}$=26 fs *4* (1987Ki02).
13259.5+y # *4*	J+24	<10 fs	$T_{1/2}$: apparent $T_{1/2}$=22 fs *8* (1987Ki02).
14828.9+y # *4*	J+26	<24 fs	$T_{1/2}$: apparent $T_{1/2}$=22 fs *8* (1987Ki02).
16483.8+y # *5*	J+28	<7 fs	$T_{1/2}$: apparent $T_{1/2}$<11 fs (1987Ki02).
18227.7+y # *5*	J+30		$T_{1/2}$: apparent $T_{1/2}$<17 fs (1987Ki02).
20063.8+y # *6*	J+32		
21994.8+y # *6*	J+34		
24022.0+y # *7*	J+36		
26144.8+y # *8*	J+38		
28360.6+y # *9*	J+40		

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^{100}Mo(^{36}S,4nγ):SD 2005Pa30,1995Sa21,1996Cl03 (continued)

^{132}Ce Levels (continued)

E(level)	J$^{\pi}$	Comments
30663.6+y[#] *14*	J+42	
33081.6+y[#] *17*	J+44	
35585.6+y[#] *20*	J+46	
38187.7+y[#] *22*	J+48	
z[@]	J1≈(19^{-})	J$^{\pi}$: from 2005Pa30, based on 'identical' band relationships.
724.40+z[@] *10*	J1+2	
1518.70+z[@] *15*	J1+4	
2384.59+z[@] *18*	J1+6	
3313.60+z[@] *20*	J1+8	
4314.39+z[@] *23*	J1+10	
5382.89+z[@] *25*	J1+12	
6521.3+z[@] *3*	J1+14	
7732.6+z[@] *3*	J1+16	
9021.1+z[@] *3*	J1+18	
10385.6+z[@] *4*	J1+20	
11839.5+z[@] *4*	J1+22	
13377.8+z[@] *5*	J1+24	
14999.3+z[@] *5*	J1+26	
16729.5+z[@] *6*	J1+28	
18545.6+z[@] *7*	J1+30	
20452.2+z[@] *8*	J1+32	
22451.1+z[@] *9*	J1+34	
24536.7+z[@] *11*	J1+36	
u[&]	J2≈(24^{-})	J$^{\pi}$: from 2005Pa30, based on 'identical' band relationships.
890.19+u[&] *10*	J2+2	
1839.79+u[&] *15*	J2+4	
2857.29+u[&] *18*	J2+6	
3945.70+u[&] *20*	J2+8	
5107.09+u[&] *23*	J2+10	
6335.28+u[&] *25*	J2+12	
7640.6+u[&] *3*	J2+14	
9024.1+u[&] *3*	J2+16	
10489.5+u[&] *3*	J2+18	
12030.6+u[&] *4*	J2+20	
13642.1+u[&] *5*	J2+22	
15307.5+u[&] *5*	J2+24	
17043.1+u[&] *6*	J2+26	
18858.3+u[&] *7*	J2+28	
20743.4+u[&] *8*	J2+30	
22697.1+u[&] *9*	J2+32	
24697.8+u[&] *10*	J2+34	
26752.0+u[&] *11*	J2+36	

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^{100}Mo(^{36}S,4nγ):SD 2005Pa30,1995Sa21,1996Cl03 (continued)

^{132}Ce Levels (continued)

† Decays to four normal-deformed bands (1988NoZY).

‡ From DSAM (1987Ki02). Lifetime data from DSAM for three SD bands are reported by 1996Cl03 and values are given in terms of Fτ and deduced quadrupole moments for the bands.

Band(A): SD-1 band (2005Pa30,1996Se04,1995Sa21,1987Ki02,1985No02). Q(intrinsic)=7.4 *2*: weighted average of 7.4 *3* (1996Cl03), 7.4 *9* (1995Ha28), 7.5 *6* (recalculated 8.8 *8* by 1990RE12 from data of 1987Ki02), 7.5 *7* (quoted by 1992PaZW). Other: 7.1 (1994WaZV). β_2(from Q)=0.41 *4* (1995Ha28), 0.39 *2* (1994WaZV). Percent population=1.4 to 3.5 (1998Wi13) as bombarding energy increases from 135 to 150 MeV in ^{100}Mo(^{36}S,4nγ). Remains constant at about 3.5% between 150 and 175 MeV. Percent population=5 in ^{100}Mo(^{36}S,4nγ) E=150 MeV (1987Ki02); 5.5 in ^{100}Mo(^{36}S,4nγ) E=155 MeV (1995Sa21), ≈6 (2005Pa30). 1996Cl03 point that in the decay of this band, it is seen that all transitions in the BAND(F) up to and including the 822 keV ($18^+\rightarrow16^+$) γ and no evidence for the 936 keV ($20^+\rightarrow18^+$). Configuration=(($\pi5^4$)⊗($\nu6^2$)) (1995Ha34). There is some evidence of ΔJ=2 staggering in the lower and higher rotational frequency regions, but not in the middle range (1996Se04). Measurements of quasicontinuum spectra by 1998Fa07 suggest that the SD band is fed by a highly deformed quasicontinuum of transitions of quadrupole character. Configuration proposed by 2005Pa30: Lower part of SD-1 band: $\pi[(g_{9/2}^{-2})(d_{5/2}/g_{7/2})^6(h_{11/2}^4)]\nu[(h_{11/2}{}^{-4})(d_{5/2}/g_{7/2})^{-4}(d_{3/2}/s_{1/2})^{-4}\ (h_{9/2}/f_{7/2})^2(i_{13/2}^2)]$. At higher spins different configurations are discussed by 2005Pa30, one such configuration being: starting at $(h_{9/2}/f_{7/2})^2$ and then becoming $(h_{9/2}/f_{7/2})^3$.

@ Band(B): SD-2 band (2005Pa30,1995Sa21,1996Cl03). Percent population=1.0 (1995Sa21) in ^{100}Mo(^{36}S,4nγ) E=155 MeV. ≈ 1 (2005Pa30) at E(^{36}S)=160, 165 MeV. Q(intrinsic)=7.3 *4* (1996Cl03) from DSAM data for all the transitions in the band. Probable excitation of a neutron from 1/2[411] (α=+1/2) or 7/2[523] orbital to 1/2[530] or 3/2[651] α=+1/2 orbital (1995Sa21, 1996Cl03).

& Band(C): SD-3 band (2005Pa30,1995Sa21,1996Cl03). Percent population=1.0 (1995Sa21) in ^{100}Mo(^{36}S,4nγ) E=155 MeV; ≈ 1 (2005Pa30) at E(^{36}S)=160, 165 MeV. Q(intrinsic)=7.6 *4* (1996Cl03) from DSAM data for all the transitions in the band. Probable excitation of a neutron from 1/2[411] (α=+1/2) or 7/2[523] orbital to 1/2[530] or 3/2[651] α=+1/2 orbital (1995Sa21, 1996Cl03).

γ(^{132}Ce)

Angular intensity ratio (from 2005Pa30): R=I($\gamma\gamma$)(measured at 158°,gated at 90°)/ I($\gamma\gamma$)(measured at 90°,gated at 158°). Value of ≈1.0 is expected for ΔJ=2, E2 transitions and ≈0.65 for ΔJ=1, dipole transitions.

E_γ†	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	Comments
724.4 *1*	0.47 *1*	724.40+z	J1+2	z	J1≈(19$^-$)	Q	R=0.9 *2*.
770.8 *1*	0.10 *1*	770.80+y	J+2	y	J≈(20$^+$)	Q	E_γ: other: 769.61 *10* (1996Se04). R=1.0 *2*.
794.3 *1*	0.70 *2*	1518.70+z	J1+4	724.40+z	J1+2	Q	R=0.8 *2*.
809.3 *1*	0.67 *1*	1580.10+y	J+4	770.80+y	J+2	E2	E_γ: other: 808.55 *5* (1996Se04). R=0.9 *2*.
865.7 *1*	0.76 *1*	2445.81+y	J+6	1580.10+y	J+4	E2	E_γ: other: 864.85 *5* (1996Se04). R=0.9 *1*.
865.9 *1*	0.99 *2*	2384.59+z	J1+6	1518.70+z	J1+4	Q	R=0.8 *2*.
890.2 *1*	0.50 *2*	890.19+u	J2+2	u	J2≈(24$^-$)		
929.0 *1*	0.97 *2*	3313.60+z	J1+8	2384.59+z	J1+6	Q	R=1.0 *2*.
929.6 *1*	1.00	3375.41+y	J+8	2445.81+y	J+6	E2	E_γ: other: 928.80 *5* (1996Se04). R=1.0 *1*.
949.6 *1*	0.71 *2*	1839.79+u	J2+4	890.19+u	J2+2	Q	R=1.2 *4*.
995.9 *1*	0.95 *1*	4371.31+y	J+10	3375.41+y	J+8	E2	E_γ: other: 994.63 *5* (1996Se04). R=1.0 *1*.
1000.8 *1*	1.00	4314.39+z	J1+10	3313.60+z	J1+8	Q	R=0.8 *2*.
1017.5 *1*	0.76 *2*	2857.29+u	J2+6	1839.79+u	J2+4		
1061.7 *1*	0.89 *1*	5433.02+y	J+12	4371.31+y	J+10	E2	E_γ: other: 1060.32 *5* (1996Se04). R=0.9 *1*.
1068.5 *1*	0.80 *2*	5382.89+z	J1+12	4314.39+z	J1+10	Q	R=1.2 *4*.

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^{100}Mo(^{36}S,4nγ):SD 2005Pa30,1995Sa21,1996Cl03 (continued)

γ(^{132}Ce) (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	Comments
1088.4 *1*	0.72 *2*	3945.70+u	J2+8	2857.29+u	J2+6	Q	R=1.1 *3*.
1128.8 *1*	0.82 *1*	6561.8+y	J+14	5433.02+y	J+12	E2	E_γ: other: 1127.27 *6* (1996Se04). R=1.0 *1*.
1138.4 *1*	0.86 *2*	6521.3+z	J1+14	5382.89+z	J1+12	Q	R=1.4 *4*.
1161.4 *1*	0.84 *2*	5107.09+u	J2+10	3945.70+u	J2+8	Q	R=1.3 *5*.
1196.4 *1*	0.80 *1*	7758.2+y	J+16	6561.8+y	J+14	E2	E_γ: other: 1194.72 *6* (1996Se04). R=1.0 *2*.
1211.3 *1*	0.78 *2*	7732.6+z	J1+16	6521.3+z	J1+14	(Q)	R=0.8 *2*.
1228.2 *1*	0.90 *2*	6335.28+u	J2+12	5107.09+u	J2+10	Q	R=1.3 *4*.
1265.6 *1*	0.72 *1*	9023.8+y	J+18	7758.2+y	J+16	E2	E_γ: other: 1263.63 *6* (1996Se04). R=1.0 *2*.
1288.5 *1*	0.67 *2*	9021.1+z	J1+18	7732.6+z	J1+16	Q	R=1.1 *2*.
1305.3 *1*	1.00	7640.6+u	J2+14	6335.28+u	J2+12	(Q)	R=1.0 *3*.
1336.8 *1*	0.61 *1*	10360.6+y	J+20	9023.8+y	J+18	E2	E_γ: other: 1334.56 *7* (1996Se04). R=1.0 *2*.
1364.5 *1*	0.53 *2*	10385.6+z	J1+20	9021.1+z	J1+18	Q	R=1.6 *4*.
1383.5 *1*	0.85 *2*	9024.1+u	J2+16	7640.6+u	J2+14	(Q)	R=0.9 *3*.
1410.7 *1*	0.56 *1*	11771.4+y	J+22	10360.6+y	J+20	E2	E_γ: other: 1408.34 *9* (1996Se04). R=0.9 *2*.
1453.9 *2*	0.47 *2*	11839.5+z	J1+22	10385.6+z	J1+20	Q	R=1.6 *4*.
1465.4 *1*	0.70 *2*	10489.5+u	J2+18	9024.1+u	J2+16	(Q)	R=0.9 *3*.
1488.1 *1*	0.44 *1*	13259.5+y	J+24	11771.4+y	J+22	E2	E_γ: other: 1485.67 *10* (1996Se04). R=1.0 *2*.
1538.3 *2*	0.46 *2*	13377.8+z	J1+24	11839.5+z	J1+22	Q	R=1.6 *4*.
1541.1 *2*	0.43 *2*	12030.6+u	J2+20	10489.5+u	J2+18	(Q)	R=0.7 *3*.
1569.4 *2*	0.40 *1*	14828.9+y	J+26	13259.5+y	J+24	E2	E_γ: other: 1566.70 *10* (1996Se04). R=1.0 *2*.
1611.5 *2*	0.30 *2*	13642.1+u	J2+22	12030.6+u	J2+20	(Q)	R=0.8 *3*.
1621.5 *2*	0.17 *2*	14999.3+z	J1+26	13377.8+z	J1+24	Q	R=1.1 *3*.
1654.9 *2*	0.30 *1*	16483.8+y	J+28	14828.9+y	J+26	E2	E_γ: other: 1651.49 *12* (1996Se04). R=1.0 *2*.
1665.4 *3*	0.21 *2*	15307.5+u	J2+24	13642.1+u	J2+22		
1730.1 *3*	0.13 *2*	16729.5+z	J1+28	14999.3+z	J1+26	Q	R=1.4 *3*.
1735.6 *3*	0.24 *2*	17043.1+u	J2+26	15307.5+u	J2+24		
1743.9 *2*	0.25 *1*	18227.7+y	J+30	16483.8+y	J+28	Q	E_γ: other: 1740.29 *14* (1996Se04). R=1.1 *2*.
1815.2 *3*	0.16 *2*	18858.3+u	J2+28	17043.1+u	J2+26		
1816.1 *3*	0.10 *2*	18545.6+z	J1+30	16729.5+z	J1+28		
1836.1 *2*	0.21 *1*	20063.8+y	J+32	18227.7+y	J+30	Q	E_γ: other: 1832.64 *17* (1996Se04). R=1.1 *2*.
1885.0 *4*	0.17 *2*	20743.4+u	J2+30	18858.3+u	J2+28		
1906.6 *4*	0.09 *2*	20452.2+z	J1+32	18545.6+z	J1+30		
1931.0 *2*	0.15 *1*	21994.8+y	J+34	20063.8+y	J+32	Q	E_γ: other: 1926.50 *17* (1996Se04). R=1.1 *2*.
1953.7 *4*	0.12 *2*	22697.1+u	J2+32	20743.4+u	J2+30		
1998.9 *5*	0.06 *2*	22451.1+z	J1+34	20452.2+z	J1+32		
2000.7 *4*	0.12 *2*	24697.8+u	J2+34	22697.1+u	J2+32		
2027.2 *3*	0.09 *1*	24022.0+y	J+36	21994.8+y	J+34	Q	E_γ: other: 2023.50 *20* (1996Se04). R=1.1 *2*.
2054.2 *5*	0.03 *1*	26752.0+u	J2+36	24697.8+u	J2+34		
2085.6 *5*	0.05 *2*	24536.7+z	J1+36	22451.1+z	J1+34		
2122.8 *4*	0.05 *1*	26144.8+y	J+38	24022.0+y	J+36	Q	E_γ: other: 2119.00 *25* (1996Se04). R=1.6 *5*.
2215.7 *5*	0.03 *1*	28360.6+y	J+40	26144.8+y	J+38		
2303 *1*	0.02 *1*	30663.6+y	J+42	28360.6+y	J+40		
2418 *1*	<0.01	33081.6+y	J+44	30663.6+y	J+42		

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^{100}Mo(^{36}S,4nγ):SD 2005Pa30,1995Sa21,1996Cl03 (continued)

γ(^{132}Ce) (continued)

E_γ †	I_γ ‡	E_i(level)	J^π_i	E_f	J^π_f
2504 *1*	<0.01	35585.6+y	J+46	33081.6+y	J+44
2602 *1*	<0.01	38187.7+y	J+48	35585.6+y	J+46

† From 2005Pa30. Others: 1996Se04, 1995Sa21 and 1987Ki02. 1987Ki02. For SD-1 band, values from 1996Se04 are more precisely quoted than in 2005Pa30, but are systematically lower (by about 1 keV at 800 keV to about 4 keV at 2100 keV) than those in 2005Pa30. In addition, the band is extended in 2005Pa30 by five transitions at the top.

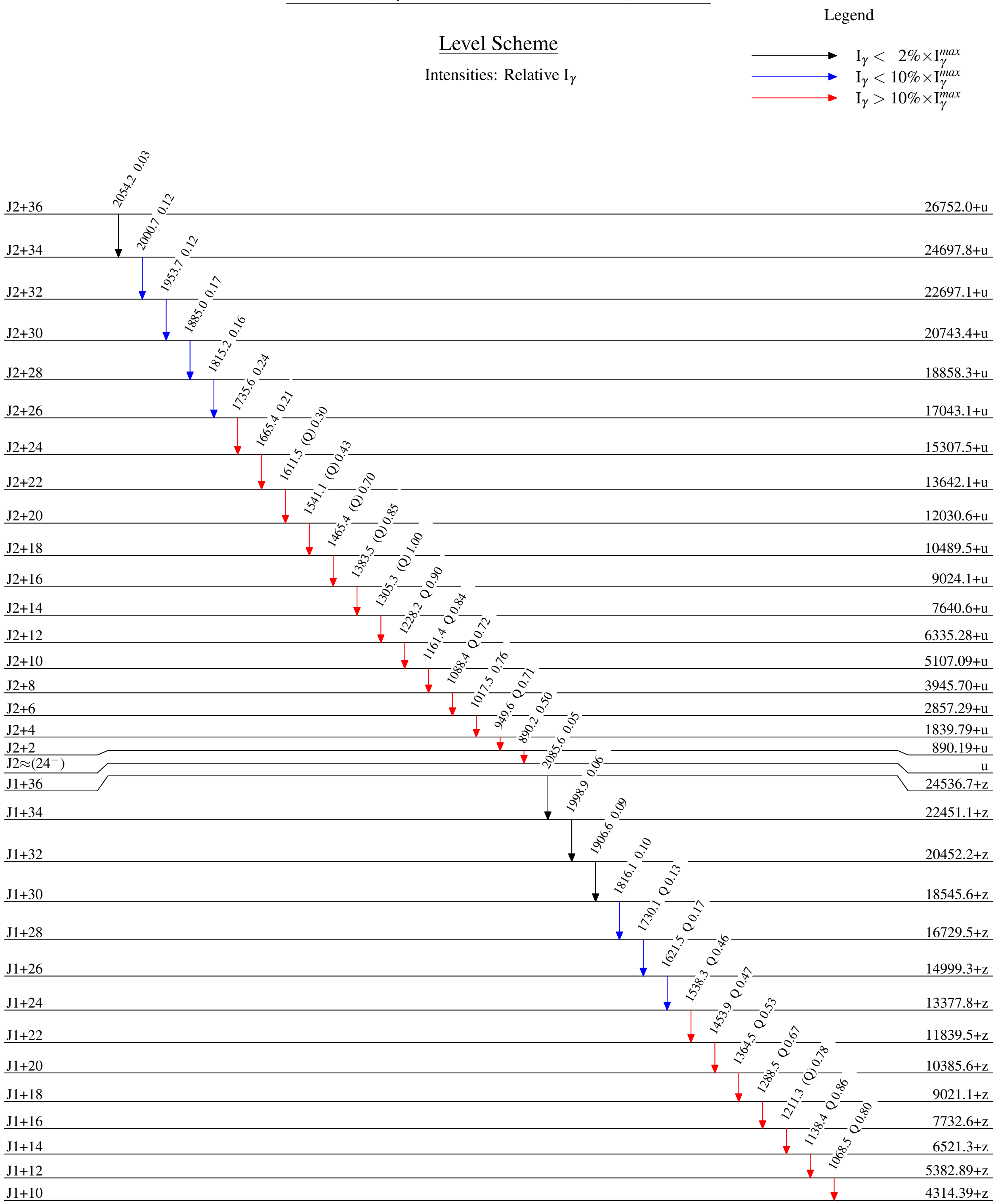
‡ Relative intensities within each band from 2005Pa30. Others: 1996Cl03, 1995Sa21 and 1987Ki02.

From $\gamma\gamma(\theta)$; RUL used when level lifetimes are known In SD-1 band.

^{100}Mo(^{36}S,4nγ):SD 2005Pa30,1995Sa21,1996Cl03

Level Scheme

Intensities: Relative I_γ



$^{132}_{58}Ce_{74}$

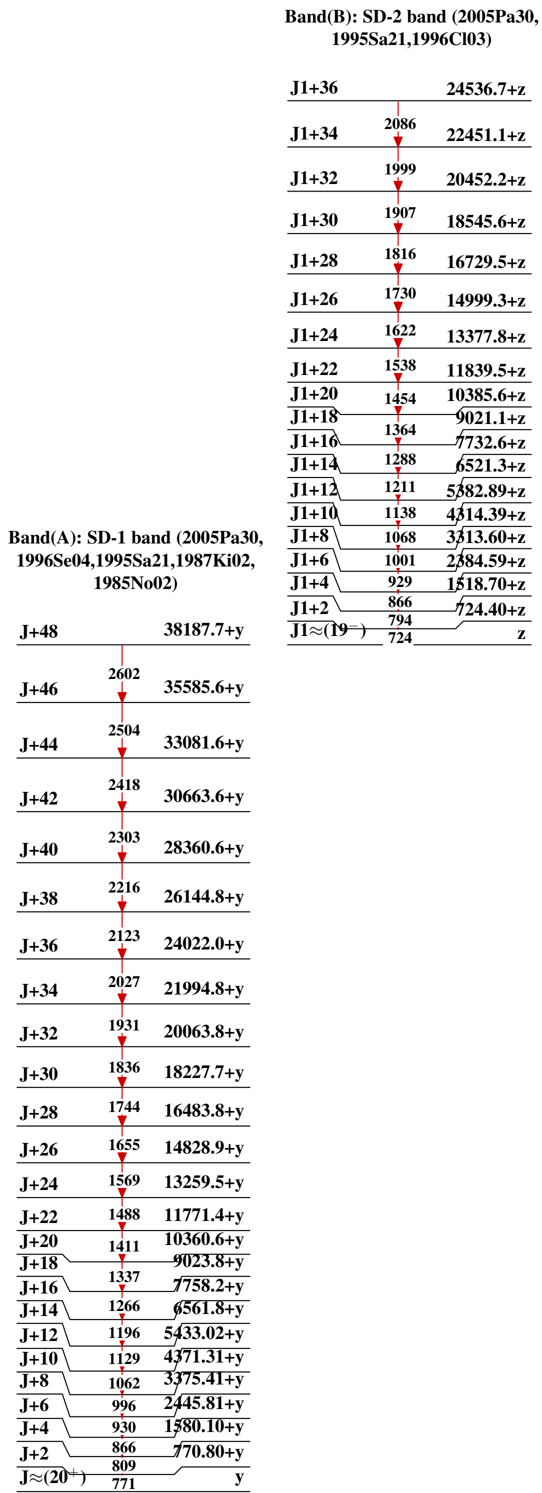
^{100}Mo(^{36}S,4nγ):SD 2005Pa30,1995Sa21,1996Cl03

Level Scheme (continued)

Intensities: Relative I_γ

$^{132}_{58}Ce_{74}$

$^{100}Mo(^{36}S,4n\gamma)$:SD 2005Pa30,1995Sa21,1996Cl03



$^{132}_{58}Ce_{74}$

^{100}Mo(^{36}S,4nγ):SD 2005Pa30,1995Sa21,1996Cl03 (continued)