^{116}Cd(^{48}Ca,4nγ):tsd 2009Ol09,2011Ol02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 176, 1 (2021)	1-May-2021

2011Ol02 and 2009Ol09 were compiled for XUNDL database by J. Chen and B. Singh, and B. Singh, respectively (both from McMaster).

2011Ol02: ^{116}Cd(^{48}Ca,4n), E(^{48}Ca)=215 MeV; the beam of ^{48}Ca was produced at the ATLAS facility at Argonne National Laboratory. Targets of two enriched (98.7%) ^{116}Cd foils with a total thickness of 1.3 mg/cm^2. γ-rays were detected by the Gammasphere γ-ray spectrometer consisting of 101 Compton-suppressed HPGe detectors. Measured Eγ, Iγ, $\gamma(\theta)$, $\gamma\gamma(\theta)$. Deduced levels, J, π, band structures, triaxial superdeformed bands (TSD).

2009Ol09: ^{116}Cd(^{48}Ca,4n), E(^{48}Ca)=215 MeV. Measured Eγ, Iγ, $\gamma\gamma$ using Gammasphere array of 101 HPGe detectors at ATLAS, ANL facility. Deduced two triaxial SD bands at high spins. Comparisons with cranked Nilsson-Strutinsky calculations and potential energy surface diagrams.

2009Ol09 state that the present paper supersedes their earlier conference reports: 2008SiZW and 2009Ri05.

2009Ol09 give bands 1 and 2, while 2011Ol02 give all three bands (with better defined Eγ's for the first two bands). Both papers are based on the same experimental data and are done by the same group.

The bands were identified from observation of several known transitions in the normal-deformed structures in coincidence with the transitions in the bands reported here.

^{160}Er Levels

Bands 1 and 2 are possible signature partners.

E(level)	J$^\pi$	Comments
x†	J1≈(33)	Additional information 1.
1017.3+x† *6*	J1+2	
2079.0+x† *9*	J1+4	
3179.0+x† *11*	J1+6	
4319.4+x† *12*	J1+8	
5505.0+x† *14*	J1+10	
6738.4+x† *15*	J1+12	
8024.6+x† *16*	J1+14	
9370.8+x† *17*	J1+16	
10777.7+x† *18*	J1+18	
12251.9+x† *19*	J1+20	
13784.2+x† *20*	J1+22	
15377.2+x?† *23*	J1+24	
17043.2+x?† *25*	J1+26	
y‡	J2≈(33)	Additional information 2.
947.0+y?‡ *10*	J2+2	
1948.9+y‡ *12*	J2+4	
3003.3+y‡ *14*	J2+6	
4101.6+y‡ *15*	J2+8	
5239.6+y‡ *16*	J2+10	
6425.2+y‡ *17*	J2+12	
7668.0+y‡ *18*	J2+14	
8973.1+y‡ *19*	J2+16	
10360.3+y‡ *20*	J2+18	

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^{116}Cd(^{48}Ca,4nγ):tsd 2009Ol09,2011Ol02 (continued)

^{160}Er Levels (continued)

E(level)	J^π	Comments
11830.4+y‡ *21*	J2+20	
13398.5+y?‡ *23*	J2+22	
z#	J3≈(27)	Additional information 3.
828.7+z# *6*	J3+2	
1677.1+z# *9*	J3+4	
2567.3+z# *11*	J3+6	
3506.8+z# *12*	J3+8	
4497.9+z# *14*	J3+10	
5546.6+z# *15*	J3+12	
6657.3+z# *16*	J3+14	
7823.6+z# *17*	J3+16	
9056.4+z# *18*	J3+18	
10359.4+z# *21*	J3+20	
11734.4+z# *23*	J3+22	
13190.5+z?# *25*	J3+24	

† Band(A): Triaxial SD-1 band. Proposed configuration, relative to ^{146}Gd core: $\pi[(h_{11/2})^6(h_{9/2}f_{7/2})^1(i_{13/2})^1]\otimes \nu[(N=4)^{-2}(h_{11/2})^{-2}(i_{13/2})^5]$. Estimated deformation parameters: $\varepsilon \approx 0.37$, $\gamma=\pm 20°$. Percent population ≈ 0.01, relative to the intensity of 4n channel.

‡ Band(B): Triaxial SD-2 band. Proposed configuration, relative to ^{146}Gd core: $\pi[(h_{11/2})^6(h_{9/2}f_{7/2})^1(i_{13/2})^1]\otimes \nu[(N=4)^{-2}(h_{11/2})^{-2}(i_{13/2})^5]$. Estimated deformation parameters: $\varepsilon \approx 0.37$, $\gamma=\pm 20°$. Percent population ≈ 0.01, relative to the intensity of 4n channel. Estimated deformation parameters: $\varepsilon \approx 0.37$, $\gamma=\pm 20°$.

Band(C): Triaxial SD-3 band. Based on the dynamic moment of inertia behavior, this band appears to be based on similar underlying structure as bands 1 and 2 and is interperted as strongly deformed traixial band. Estimated deformation parameters: $\varepsilon \approx 0.37$, $\gamma \approx 22°$. 2011Ol02 found 1257γ as a possible candidate for the decay of this band to the main (normal deformed) level scheme. The yrast transitions up to the decay of the 20^+ state are observed in the spectrum of this band, confirming its association with ^{160}Er and suggesting a bandhead spin of >20.

$\gamma(^{160}Er)$

E_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
828.7 *6*	828.7+z	J3+2	z	J3≈(27)	1166.3 *6*	7823.6+z	J3+16	6657.3+z	J3+14
848.4 *6*	1677.1+z	J3+4	828.7+z	J3+2	1185.6 *6*	5505.0+x	J1+10	4319.4+x	J1+8
890.2 *6*	2567.3+z	J3+6	1677.1+z	J3+4	1185.6 *6*	6425.2+y	J2+12	5239.6+y	J2+10
939.5 *6*	3506.8+z	J3+8	2567.3+z	J3+6	1232.8 *6*	9056.4+z	J3+18	7823.6+z	J3+16
947‡ *1*	947.0+y?	J2+2	y	J2≈(33)	1233.4 *6*	6738.4+x	J1+12	5505.0+x	J1+10
991.1 *6*	4497.9+z	J3+10	3506.8+z	J3+8	1242.8 *6*	7668.0+y	J2+14	6425.2+y	J2+12
1001.9 *6*	1948.9+y	J2+4	947.0+y?	J2+2	1286.2 *6*	8024.6+x	J1+14	6738.4+x	J1+12
1017.3 *6*	1017.3+x	J1+2	x	J1≈(33)	1303‡ *1*	10359.4+z	J3+20	9056.4+z	J3+18
1048.7 *6*	5546.6+z	J3+12	4497.9+z	J3+10	1305.1 *6*	8973.1+y	J2+16	7668.0+y	J2+14
1054.4 *6*	3003.3+y	J2+6	1948.9+y	J2+4	1346.2 *6*	9370.8+x	J1+16	8024.6+x	J1+14
1061.7 *6*	2079.0+x	J1+4	1017.3+x	J1+2	1375‡ *1*	11734.4+z	J3+22	10359.4+z	J3+20
1098.3 *6*	4101.6+y	J2+8	3003.3+y	J2+6	1387.2 *6*	10360.3+y	J2+18	8973.1+y	J2+16
1100.0 *6*	3179.0+x	J1+6	2079.0+x	J1+4	1406.9 *6*	10777.7+x	J1+18	9370.8+x	J1+16
1110.7 *6*	6657.3+z	J3+14	5546.6+z	J3+12	1456‡ *1*	13190.5+z?	J3+24	11734.4+z	J3+22
1138.0 *6*	5239.6+y	J2+10	4101.6+y	J2+8	1470.1 *6*	11830.4+y	J2+20	10360.3+y	J2+18
1140.4 *6*	4319.4+x	J1+8	3179.0+x	J1+6	1474.1 *6*	12251.9+x	J1+20	10777.7+x	J1+18

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^{116}Cd(^{48}Ca,4nγ):tsd 2009Ol09,2011Ol02 (continued)

$\gamma(^{160}Er)$ (continued)

E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π
1532.3 *6*	13784.2+x	J1+22	12251.9+x	J1+20
1568[‡] *1*	13398.5+y?	J2+22	11830.4+y	J2+20
1593[‡] *1*	15377.2+x?	J1+24	13784.2+x	J1+22
1666[‡] *1*	17043.2+x?	J1+26	15377.2+x?	J1+24

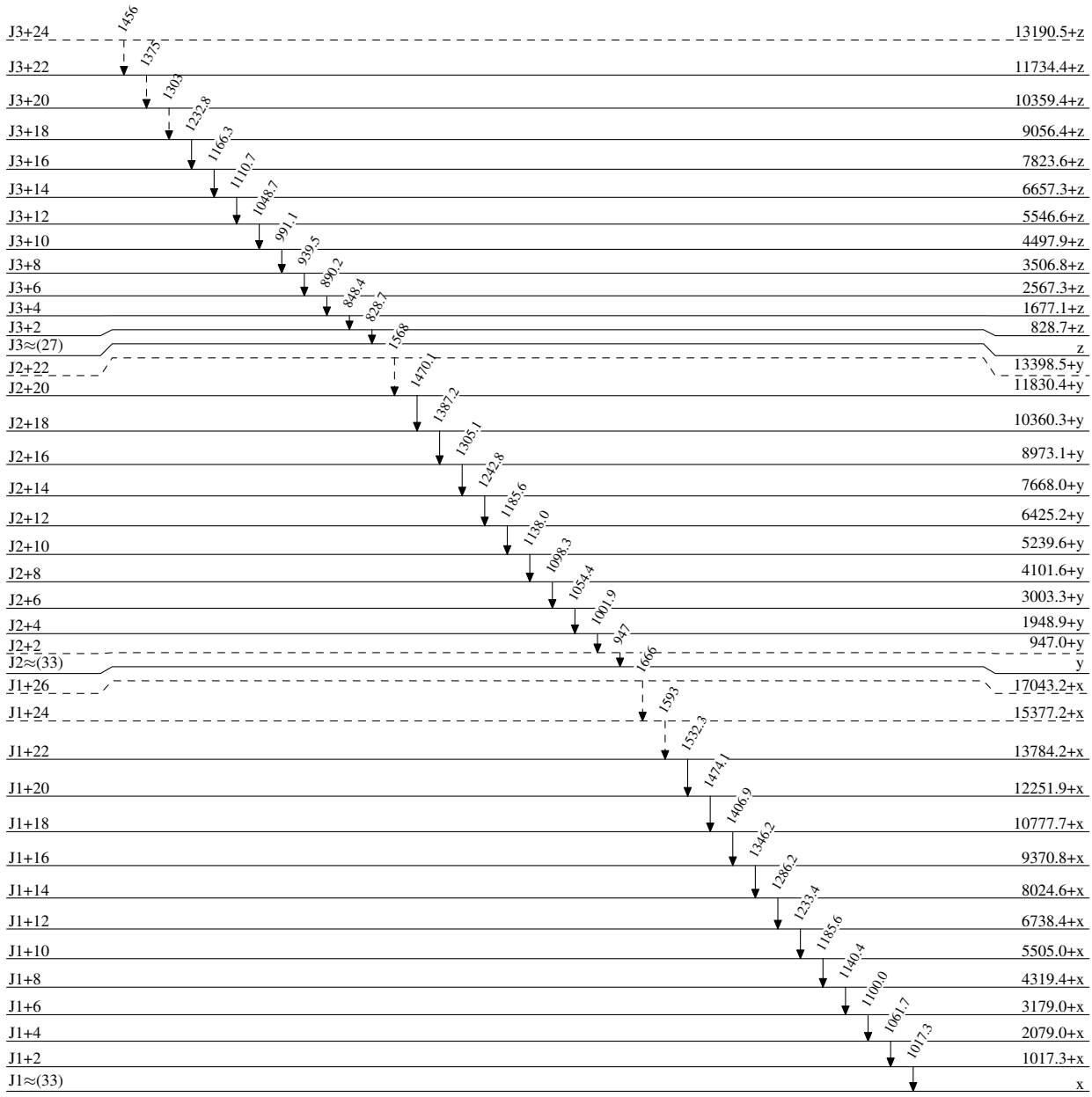
[†] From 2011Ol02.
[‡] Placement of transition in the level scheme is uncertain.

Legend

^{116}Cd(^{48}Ca,4nγ):T1/2SD 2009Ol09,2011Ol02

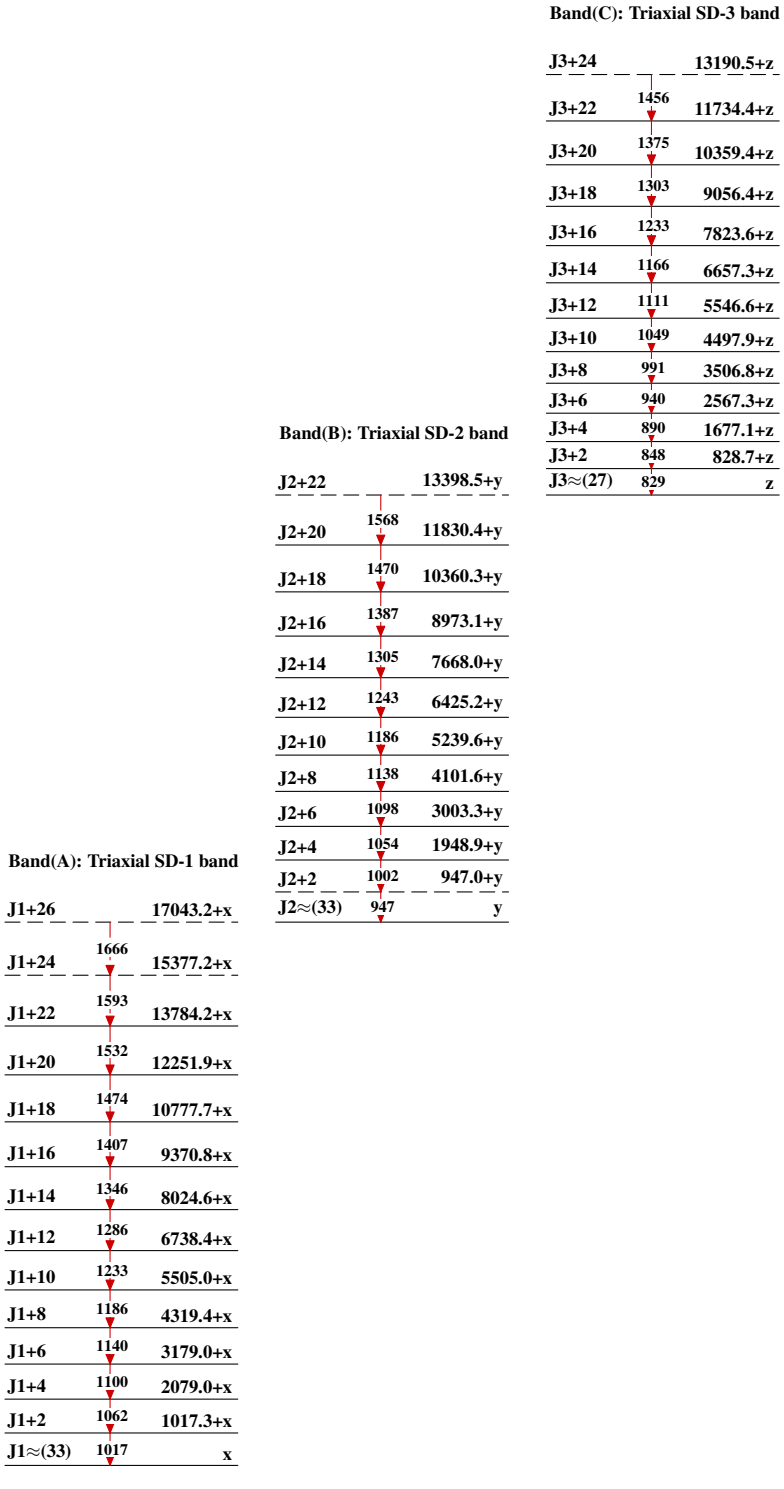
Level Scheme

γ Decay (Uncertain)



$^{160}_{68}Er_{92}$

^{116}Cd(^{48}Ca,4nγ):T1/2SD 2009Ol09,2011Ol02



$^{160}_{68}Er_{92}$