

¹⁰⁶Cd(⁶⁰Ni,2p2n γ) 2016Jo01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 195,1 (2024)	19-Sep-2023

2016Jo01 compiled for XUNDL database by B. Singh (McMaster).

2016Jo01: E=270 MeV. Target=1.0 mg/cm² thick, 96.5% enriched ¹⁰⁶Cd self-supporting foil. Measured E γ , I γ , $\gamma\gamma$ -coin, $\gamma\gamma(\theta)$ (DCO), recoil implants, (implants) γ -coin. Recoil-decay tagging technique using RITU gas-filled separator and GREAT spectrometer and JUROGAM array at University of Jyväskylä accelerator laboratory. Deduced high-spin levels, J^π , bands, configurations, alignments. Comparison with predictions of cranked shell-model calculations.

¹⁶²W Levels

Quasiparticle orbital labeling scheme:

- A: $\nu i_{13/2}, \alpha=+1/2$; first orbital.
- B: $\nu i_{13/2}, \alpha=-1/2$; first orbital.
- E: $\nu(h_{9/2}, f_{7/2}), \alpha=+1/2$; first orbital.
- F: $\nu(h_{9/2}, f_{7/2}), \alpha=-1/2$; first orbital.
- G: $\nu(h_{9/2}, f_{7/2}), \alpha=+1/2$; second orbital.
- H: $\nu(h_{9/2}, f_{7/2}), \alpha=-1/2$; second orbital.
- e: $\pi h_{11/2}, \alpha=+1/2$; first orbital.
- f: $\pi h_{11/2}, \alpha=-1/2$; first orbital.

E(level) [†]	J^π [‡]	E(level) [†]	J^π [‡]	E(level) [†]	J^π [‡]	E(level) [†]	J^π [‡]
0.0 [#]	0 ⁺	2268.2 [#] 10	(8 ⁺)	2892.6 11		4123.2 [#] 18	(14 ⁺)
449.6 [#] 5	(2 ⁺)	2394.0 13		3048.7 15		4253.7 [@] 19	(15 ⁻)
1012.4 [#] 7	(4 ⁺)	2426.4 14		3120.3 [@] 13	(11 ⁻)	4833.3 [@] 22	(17 ⁻)
1639.0 [#] 9	(6 ⁺)	2508.8 14		3442.8 [#] 15	(12 ⁺)	4851.8 [#] 27	(16 ⁺)
1972.8 22		2824.4 [#] 11	(10 ⁺)	3655.3 [@] 16	(13 ⁻)	5563.7 30	

[†] From least-squares fit to E γ values.

[‡] As proposed by 2016Jo01, based on $\gamma\gamma(\theta)$ (DCO) data.

[#] Band(A): Band based on g.s. Configuration= $\nu i_{13/2}^2$ before the band crossing at $\hbar\omega \approx 0.3$ MeV, $\nu i_{13/2}^2 \otimes \nu h_{9/2}^2$ after the crossing.

[@] Band(B): Band based on (11⁻). Configuration= $\nu i_{13/2} \otimes \nu(h_{9/2}, f_{7/2})$.

$\gamma(^{162}\text{W})$

The DCO ratios are for 90° and 158° geometry, with gates on $\Delta J=2$, quadrupole transitions. For a guide, DCO values for known transitions in ¹⁶⁴W were 0.94 9 for 490 γ , 4⁺ \rightarrow 2⁺ transition, and 0.67 14 for 752 γ , 7⁻ \rightarrow 6⁺ transition.

E γ [†]	I γ	E _i (level)	J^π_i	E _f	J^π_f	Mult. [‡]	Comments
156.1 10	4.2 7	3048.7		2892.6			
295.9 5	15.0 13	3120.3	(11 ⁻)	2824.4	(10 ⁺)		
384.0 10	2.8 7	2892.6		2508.8			
449.6 5	100.0 15	449.6	(2 ⁺)	0.0	0 ⁺	(E2)	DCO=1.2 2
499.8 20	1.5 6	2892.6		2394.0			
535.0 10	9.0 9	3655.3	(13 ⁻)	3120.3	(11 ⁻)		
556.2 5	26.1 18	2824.4	(10 ⁺)	2268.2	(8 ⁺)		Initial level $J^\pi=(10^-)$ listed in Table III of 2016Jo01 is a misprint.
562.8 5	90.0 6	1012.4	(4 ⁺)	449.6	(2 ⁺)	(E2)	DCO=1.3 2

Continued on next page (footnotes at end of table)

$^{106}\text{Cd}(^{60}\text{Ni},2\text{p}2\text{n}\gamma)$ 2016Jo01 (continued) $\gamma(^{162}\text{W})$ (continued)

E_γ †	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
579.6 10	2.3 5	4833.3	(17 ⁻)	4253.7	(15 ⁻)	
598.4 10	5.3 7	4253.7	(15 ⁻)	3655.3	(13 ⁻)	
618.4 10	7.6 10	3442.8	(12 ⁺)	2824.4	(10 ⁺)	
624.3 5	11.2 12	2892.6		2268.2	(8 ⁺)	
626.6 5	67 4	1639.0	(6 ⁺)	1012.4	(4 ⁺)	
629.1 5	33.5 24	2268.2	(8 ⁺)	1639.0	(6 ⁺)	(13 ⁻) → (11 ⁻) listed in Table III of 2016Jo01 seems a misprint in view of placement and J^π values shown in authors' Figure 5.
680.4 10	2.0 5	4123.2	(14 ⁺)	3442.8	(12 ⁺)	(8 ⁺) → (6 ⁺) listed in Table III of 2016Jo01 seems a misprint in view of placement and J^π values shown in authors' Figure 5.
728.6 20	1.1 4	4851.8	(16 ⁺)	4123.2	(14 ⁺)	
730.4 20	1.1 4	5563.7		4833.3	(17 ⁻)	
755.3 10	6.2 11	2394.0		1639.0	(6 ⁺)	
787.4 10	2.0 7	2426.4		1639.0	(6 ⁺)	
870.5 20	0.7 6	2508.8		1639.0	(6 ⁺)	
960.4 20	1.6 8	1972.8		1012.4	(4 ⁺)	

† 2016Jo01 assign uncertainty of 0.5 keV for γ rays with $I_\gamma > 10$, up to 2 keV for weaker γ rays. Evaluator assigns 1.0 keV for γ rays with $I_\gamma = 2-10$, and 2.0 keV for $I_\gamma < 2$.

‡ From DCO value and RUL, assuming level $T_{1/2} < 10$ ns.

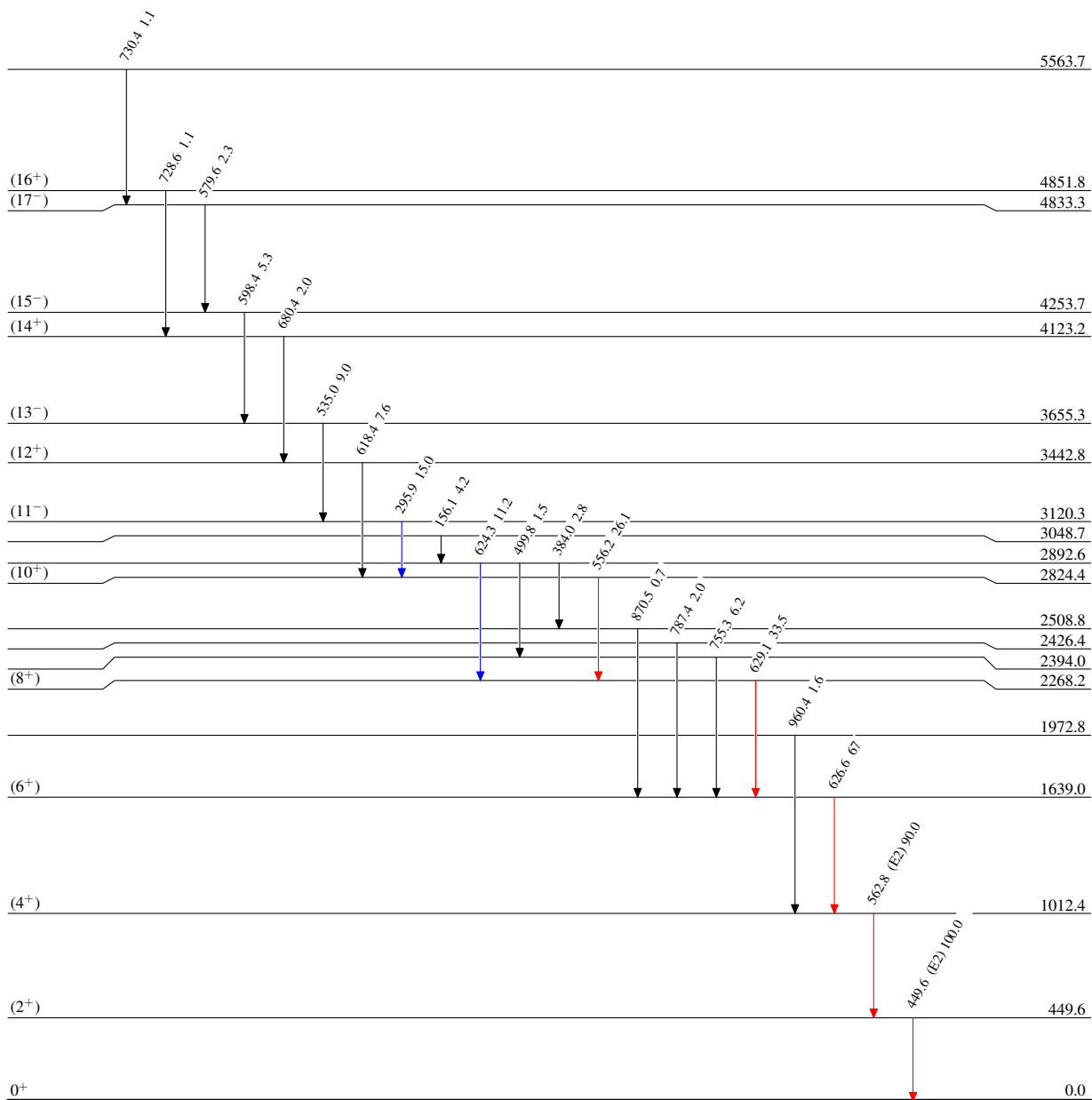
$^{106}\text{Cd}(^{60}\text{Ni},2p2n\gamma)$ 2016Jo01

Level Scheme

Intensities: Relative I_γ

Legend

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



$^{162}_{74}\text{W}_{88}$

$^{106}\text{Cd}(^{60}\text{Ni},2\text{p}2\text{n}\gamma)$ 2016Jo01

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g.s. Configuration= $\nu i_{13/2}^2$
before the band crossing
at $\hbar\omega \approx 0.3$ MeV,
 $\nu i_{13/2}^2 \otimes \nu h_{9/2}^2$
after the crossing

Band(B): Band based on
(11^-)

