^{106}Cd(^{58}Ni,2p2nγ) 2001Ke09

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

Additional information 1.

^{106}Cd(^{58}Ni,2p2n):E(^{58}Ni)=286, 291 and 298 MeV. Self-supporting ^{106}Cd target 550 μg/cm^2 thick. γ rays studied using the JUROSPHERE array, consisting of escape-suppressed HPGe detectors from the Eurogam phase 1 and TESSA arrays. The recoiling reaction products were analyzed using a gas-filled recoil separator and a position-sensitive Si strip detector. Assignment of γ's to ^{160}W was made via time correlation with α particles from ^{160}W decay and from observation of tungsten x rays in the tagged spectra. Measured Eγ, Iγ, $\gamma\gamma$ coin and inferred γ multipolarities from the ratio of Iγ values at different angles.

^{160}W Levels

E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡
0.0#	0$^+$	2228.3# 4	8$^+$	3523.2?# 5	(12$^+$)
609.9# 2	2$^+$	2899.0?# 5	(10$^+$)	4022.0?@ 6	(13$^-$)
1264.6# 3	4$^+$	2946.4 5	10$^+$	4218.8?# 6	(14$^+$)
1880.8# 4	6$^+$	3168.5@ 5	11$^{(-)}$	4735.1?@ 7	(15$^-$)
				4861.1?# 6	(16$^+$)

† From a least-squares fit to the listed Eγ values.

‡ Values as reported by 2001Ke09. They are based on γ-ray multipolarities and a presumed general increase of spin with increasing excitation energy.

Band(A): sequence of positive-parity yrast states.

@ Band(B): sequence of probable negative-parity states.

γ(^{160}W)

The quantity, R, is defined by 2001Ke09 as the ratio of Iγ values at 157.6° to those at 79 and 101°.

E$_\gamma$	I$_\gamma$†	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.‡	Comments
222.1 2	25 3	3168.5	11$^{(-)}$	2946.4	10$^+$	(E1)	R=0.88 7. Mult.: stretched D γ from asymmetry ratio, (E1) based on theoretical arguments implying unique parity orbitals $\nu i_{13/2}$ and $\pi h_{11/2}$ and systematics of even-even nuclei in this mass region having a similar decay pattern: 11$^-$ level at about 3 MeV exitation energy decaying to 10$^+$ level of the g.s. band by E1 transition. For example for ^{156}Er, ^{158}Er, ^{158}Yb, ^{158}Hf, ^{160}Hf, ^{162}W and ^{164}W nuclei having this pattern no 11$^+$ level was found, except for ^{156}Er where this level is placed at more than 600 keV above 11$^-$ level.
^{x}295.9 2	6 2						
347.5 2	70 3	2228.3	8$^+$	1880.8	6$^+$	E2	R=1.11 6.
^{x}407.4 2	10 2						
^{x}460.2 2	7 2						
^{x}493.6 2	8 2						
^{x}543.8 3	9 2						
^{x}572.6 2	12 2						
609.9 2	100 2	609.9	2$^+$	0.0	0$^+$	E2	R=1.02 7.
616.2 2	92 3	1880.8	6$^+$	1264.6	4$^+$	E2	R=1.20 7.

Continued on next page (footnotes at end of table)

^{106}Cd(^{58}Ni,2p2nγ) 2001Ke09 (continued)

γ(^{160}W) (continued)

E_γ	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Mult. ‡	Comments
624.2# *2*	42 *3*	3523.2?	(12$^+$)	2899.0?	(10$^+$)		Unresolved doublet. This placement is estimated to account for ≈90% of the total intensity.
642.3# *3*	26 *3*	4861.1?	(16$^+$)	4218.8?	(14$^+$)		Unresolved doublet. Listed value is that for the composite peak.
654.7 *2*	97 *2*	1264.6	4$^+$	609.9	2$^+$	E2	R=1.19 *5*.
670.7# *2*	39 *3*	2899.0?	(10$^+$)	2228.3	8$^+$	E2	R=1.03 *9*.
x680.6 *2*	13 *2*						
695.6# *2*	28 *3*	4218.8?	(14$^+$)	3523.2?	(12$^+$)	E2	R=1.23 *12*.
713.1# *4*	17 *3*	4735.1?	(15$^-$)	4022.0?	(13$^-$)	E2	R=1.17 *19*.
718.1 *2*	39 *3*	2946.4	10$^+$	2228.3	8$^+$	E2	R=1.24 *11*.
853.5# *3*	22 *2*	4022.0?	(13$^-$)	3168.5	11$^{(-)}$	E2	R=1.04 *13*.

† 2001Ke09 refer to "relative intensities of γ rays" and "transition intensities" in referring to the γ′s. The evaluator has assumed that the values listed in Table 1 of 2001Ke09 are in fact γ-ray intensities rather than transition intensities (which would include a contribution from internal conversion). This contribution is nominally 1% or less for most of the γ′s. The maximum contribution is ≈5% and ≈6%, respectively, for the 222 and 347 γ′s.

‡ Values inferred from the ratio, R. Values near 1.2 are assigned as stretched quadrupole transitions, most likely E2. The lone value, R=0.88, is that expected for a stretched dipole, which from systematics of near-lying nuclides, is tentatively taken to be E1.

Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

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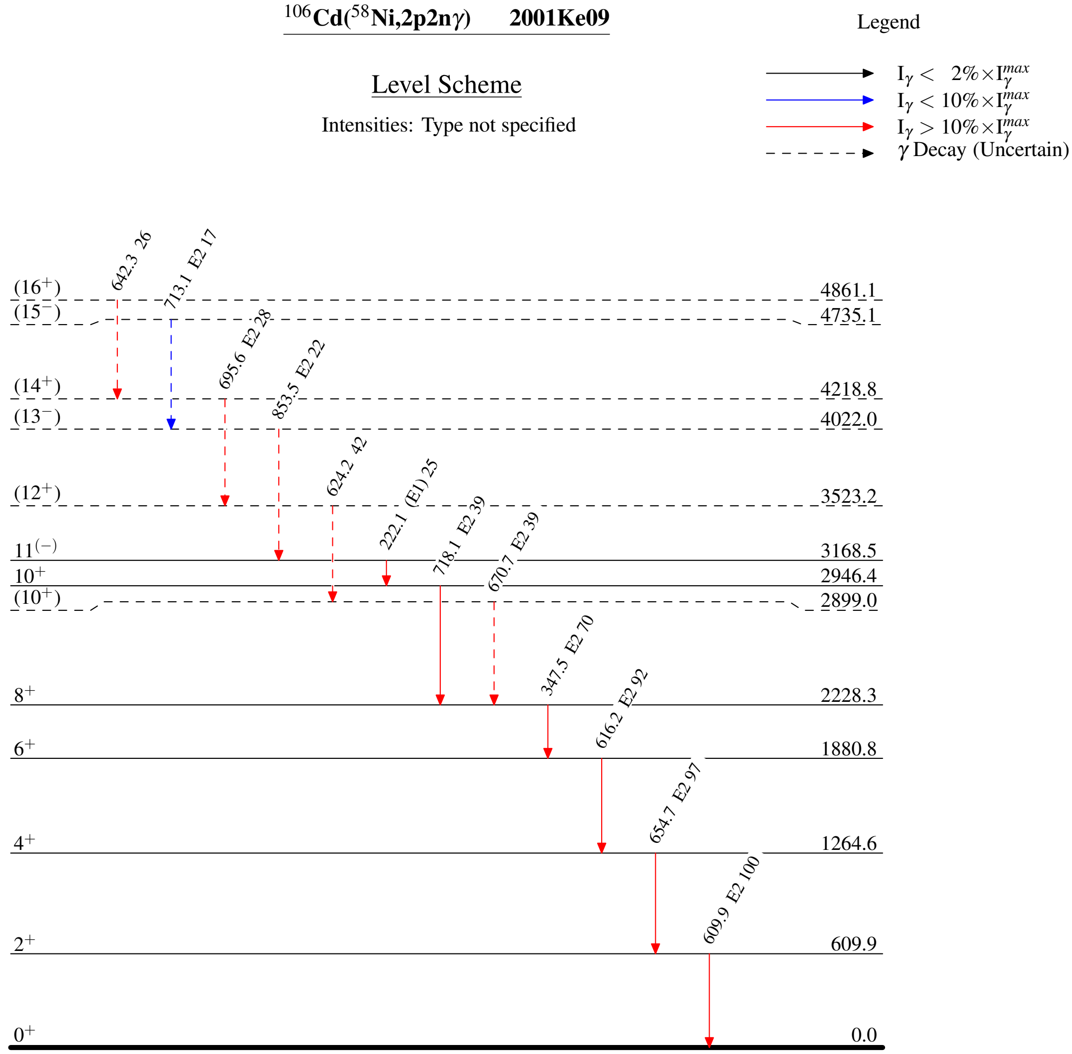
Level Scheme

Intensities: Type not specified



$^{160}_{74}W_{86}$

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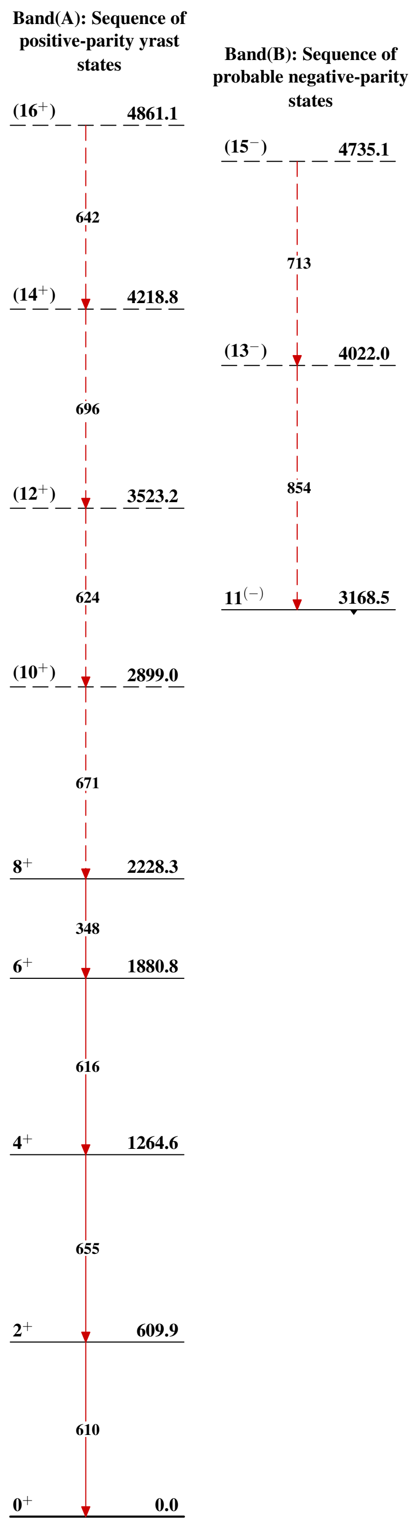

$^{160}_{74}W_{86}$