^{106}Pd(^{63}Cu,p3nγ) 1992Si12

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 194,460 (2024)	31-Oct-2022

1992Si12: E=285, 290 MeV ^{63}Cu beams were produced from the tandem Van de Graaff accelerator at the Nuclear Structure Facility (NSF) at Daresbury Laboratory. Target was a 0.5 mg/cm^2 self-supporting foil of ^{106}Pd. γ rays were detected with the POLYTESSA array of 20 escape-suppressed spectrometers (ESS) with each ESS consisting of a HPGe detector enclosed in a BGO shield; recoils were analyzed with the Daresbury recoil separator. Measured Eγ, Iγ, $\gamma\gamma$-coin, recoil-γ-coin, $\gamma\gamma(\theta)$(DCO). Deduced levels, J, π, band structures, γ-ray multipolarities. Comparisons with theoretical calculations.

^{165}W Levels

E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
0.0+x[@]	13/2$^+$	1952.2+x[@] *6*	29/2$^+$	3057.4+x[#] *7*	35/2$^-$	4959.8+x[@] *8*	45/2$^+$
277.3+x[@] *3*	17/2$^+$	1956.3+x[&] *6*	(25/2$^-$)	3341.8+x[a] *7*	(37/2$^-$)	5003.8+x[#] *8*	47/2$^-$
732.3+x[@] *4*	21/2$^+$	2302.7+x[#] *5*	27/2$^-$	3388.1+x[@] *7*	37/2$^+$	5342.4+x[a] *9*	(49/2$^-$)
1032.9+x[&] *4*	(17/2$^-$)	2445.6+x[&]	(29/2$^-$)	3633.7+x[#] *7*	39/2$^-$	5774.4+x[#] *9*	51/2$^-$
1304.4+x[@] *5*	25/2$^+$	2511.2+x[a] *6*	(29/2$^-$)	3924.5+x[a] *8*	(41/2$^-$)	6136.5+x[a] *9*	(53/2$^-$)
1546.6+x[&] *5*	(21/2$^-$)	2602.4+x[#] *6*	31/2$^-$	4164.5+x[@] *8*	41/2$^+$	6598.5+x[#] *9*	(55/2$^-$)
1860.3+x *5*		2649.5+x[@] *6*	33/2$^+$	4290.2+x[#] *8*	43/2$^-$	7470.4+x?[#] *10*	(59/2$^-$)
1948.9+x[#] *5*	23/2$^-$	2860.3+x[a] *6*	(33/2$^-$)	4601.3+x[a] *8*	(45/2$^-$)		

[†] From a least-squares fit to Eγ data, assuming Δ(Eγ)=0.3 keV.
[‡] As proposed by 1992Si12, based on systematics, DCO ratios and band structure. The assignments are consistent with those in the Adopted Levels, except that all are given in parentheses there due to lack of supporting strong arguments.
[#] Band(A): Band based on 23/2$^-$.
[@] Band(B): Yrast band based on 13/2$^+$. This band is assumed to be the energetically favored (lower) component of the $i_{13/2}$ band, consistent with the systematics of such bands in this mass region.
[&] Band(C): Band based on (17/2$^-$).
[a] Band(D): Band based on (29/2$^-$).

γ(^{165}W)

DCO(1) ratio corresponds to 30° and 90°; DCO(2) to 40° and 79°; and DCO(3) to 40° and 79°; recoil-γ gated geometry. Expected DCO values for ΔJ=2, quadrupole transitions are 1.0, when gated on stretched quadrupole (1992Si12).

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[†]	Comments
277.3	100	277.3+x	17/2$^+$	0.0+x	13/2$^+$	Q	DCO(1)=0.89 *3*; DCO(2)=1.05 *6*; DCO(3)=1.15 *5*
299.6	11.9 *11*	2602.4+x	31/2$^-$	2302.7+x	27/2$^-$	Q	DCO(1)=0.93 *6*; DCO(2)=1.01 *7*; DCO(3)=1.25 *16*
349.1	7.4 *5*	2860.3+x	(33/2$^-$)	2511.2+x	(29/2$^-$)	Q	DCO(1)=0.77 *15*; DCO(2)=0.89 *23*; DCO(3)=0.86 *14*
353.8	3.9 *4*	2302.7+x	27/2$^-$	1948.9+x	23/2$^-$	Q	DCO(1)=0.86 *15*; DCO(2)=1.02 *21*; DCO(3)=1.3 *4*
409.7	17.2 *11*	1956.3+x	(25/2$^-$)	1546.6+x	(21/2$^-$)	Q	DCO(1)=0.94 *9*; DCO(2)=1.03 *12*; DCO(3)=1.22 *15*
414.7	8.0 *7*	2860.3+x	(33/2$^-$)	2445.6+x	(29/2$^-$)	Q	DCO(1)=0.94 *12*; DCO(2)=1.09 *18*; DCO(3)=1.1 *3*
455.0[‡]	79[‡] *5*	732.3+x	21/2$^+$	277.3+x	17/2$^+$	(Q)	DCO(1)=1.05 *4*; DCO(2)=0.99 *5*; DCO(3)=1.06 *5* DCO values for the doublet.
455.0[‡]	21[‡] *3*	3057.4+x	35/2$^-$	2602.4+x	31/2$^-$	(Q)	
481.5	11.3 *7*	3341.8+x	(37/2$^-$)	2860.3+x	(33/2$^-$)	Q	DCO(1)=0.91 *19*; DCO(2)=0.94 *18*; DCO(3)=0.91 *11*
489.4 *6*	18.2 *11*	2445.6+x	(29/2$^-$)	1956.3+x	(25/2$^-$)	Q	DCO(1)=0.93 *11*; DCO(2)=0.95 *13*; DCO(3)=1.08 *15*
513.7	14.8 *9*	1546.6+x	(21/2$^-$)	1032.9+x	(17/2$^-$)	Q	DCO(1)=0.85 *16*; DCO(3)=0.70 *10*
554.9	7.6 *6*	2511.2+x	(29/2$^-$)	1956.3+x	(25/2$^-$)	Q	DCO(1)=0.84 *16*; DCO(3)=1.0 *3*

Continued on next page (footnotes at end of table)

^{106}Pd(^{63}Cu,p3nγ) 1992Si12 (continued)

$\gamma(^{165}W)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
572.1	69 *3*	1304.4+x	$25/2^+$	732.3+x	$21/2^+$	Q	DCO(1)=1.02 *6*; DCO(2)=0.99 *7*; DCO(3)=1.18 *7*
576.3	13.3 *9*	3633.7+x	$39/2^-$	3057.4+x	$35/2^-$	Q	DCO(1)=0.96 *14*; DCO(2)=0.87 *16*; DCO(3)=0.85 *13*
582.7	10.0 *9*	3924.5+x	$(41/2^-)$	3341.8+x	$(37/2^-)$	Q	DCO(1)=0.95 *12*; DCO(2)=1.14 *18*; DCO(3)=1.09 *11*
647.8	42.8 *21*	1952.2+x	$29/2^+$	1304.4+x	$25/2^+$	Q	DCO(1)=1.02 *6*; DCO(2)=0.96 *10*; DCO(3)=0.80 *9* E_γ: Unresolved from 650.2γ. DCO values for 647.8+650.2.
650.2	5.7 *8*	2602.4+x	$31/2^-$	1952.2+x	$29/2^+$		E_γ: Unresolved from 647.8γ.
656.5	10.6 *8*	4290.2+x	$43/2^-$	3633.7+x	$39/2^-$	Q	DCO(1)=0.89 *11*; DCO(2)=0.94 *17*; DCO(3)=0.79 *22*
676.8	5.5 *6*	4601.3+x	$(45/2^-)$	3924.5+x	$(41/2^-)$	Q	DCO(1)=0.92 *14*; DCO(3)=1.3 *3*
697.3	24.4 *12*	2649.5+x	$33/2^+$	1952.2+x	$29/2^+$	Q	DCO(1)=0.96 *10*; DCO(2)=1.01 *12*; DCO(3)=0.80 *11*
713.6	8.2 *7*	5003.8+x	$47/2^-$	4290.2+x	$43/2^-$	Q	DCO(1)=0.87 *10*; DCO(2)=0.92 *19*; DCO(3)=1.2 *3*
738.6	18.4 *11*	3388.1+x	$37/2^+$	2649.5+x	$33/2^+$	Q	DCO(1)=0.94 *11*; DCO(2)=1.04 *16*; DCO(3)=0.86 *18*
741.1	4.2 *6*	5342.4+x	$(49/2^-)$	4601.3+x	$(45/2^-)$		
755.6	13.2 *7*	1032.9+x	$(17/2^-)$	277.3+x	$17/2^+$	D	DCO(1)=0.96 *16*; DCO(2)=1.11 *24*; DCO(3)=1.0 *3* Mult.: $\Delta J=0$ transition.
770.6	6.3 *5*	5774.4+x	$51/2^-$	5003.8+x	$47/2^-$	Q	DCO(1)=0.86 *11*
776.4	9.5 *7*	4164.5+x	$41/2^+$	3388.1+x	$37/2^+$	Q	DCO(1)=0.94 *12*; DCO(2)=0.92 *18*
794.1	3.0 *8*	6136.5+x	$(53/2^-)$	5342.4+x	$(49/2^-)$		
795.3	3.0 *8*	4959.8+x	$45/2^+$	4164.5+x	$41/2^+$	Q	DCO(1)=0.79 *16*
814.2	5.7 *10*	1546.6+x	$(21/2^-)$	732.3+x	$21/2^+$	D	DCO(3)=1.1 *3* Mult.: $\Delta J=0$ transition.
824.1	4.1 *7*	6598.5+x	$(55/2^-)$	5774.4+x	$51/2^-$		
872[#]		7470.4+x?	$(59/2^-)$	6598.5+x	$(55/2^-)$		
998.3	10.6 *7*	2302.7+x	$27/2^-$	1304.4+x	$25/2^+$	D	DCO(1)=0.63 *17*; DCO(2)=0.65 *18*; DCO(3)=0.57 *21*
1128.0[#]		1860.3+x		732.3+x	$21/2^+$		
1216.6	3.1 *4*	1948.9+x	$23/2^-$	732.3+x	$21/2^+$		

[†] Deduced by evaluators based on $\gamma\gamma(\theta)$(DCO) in 1992Si12. No assignments are explicitly listed in 1992Si12.
[‡] Multiply placed with intensity suitably divided.
[#] Placement of transition in the level scheme is uncertain.

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Level Scheme

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

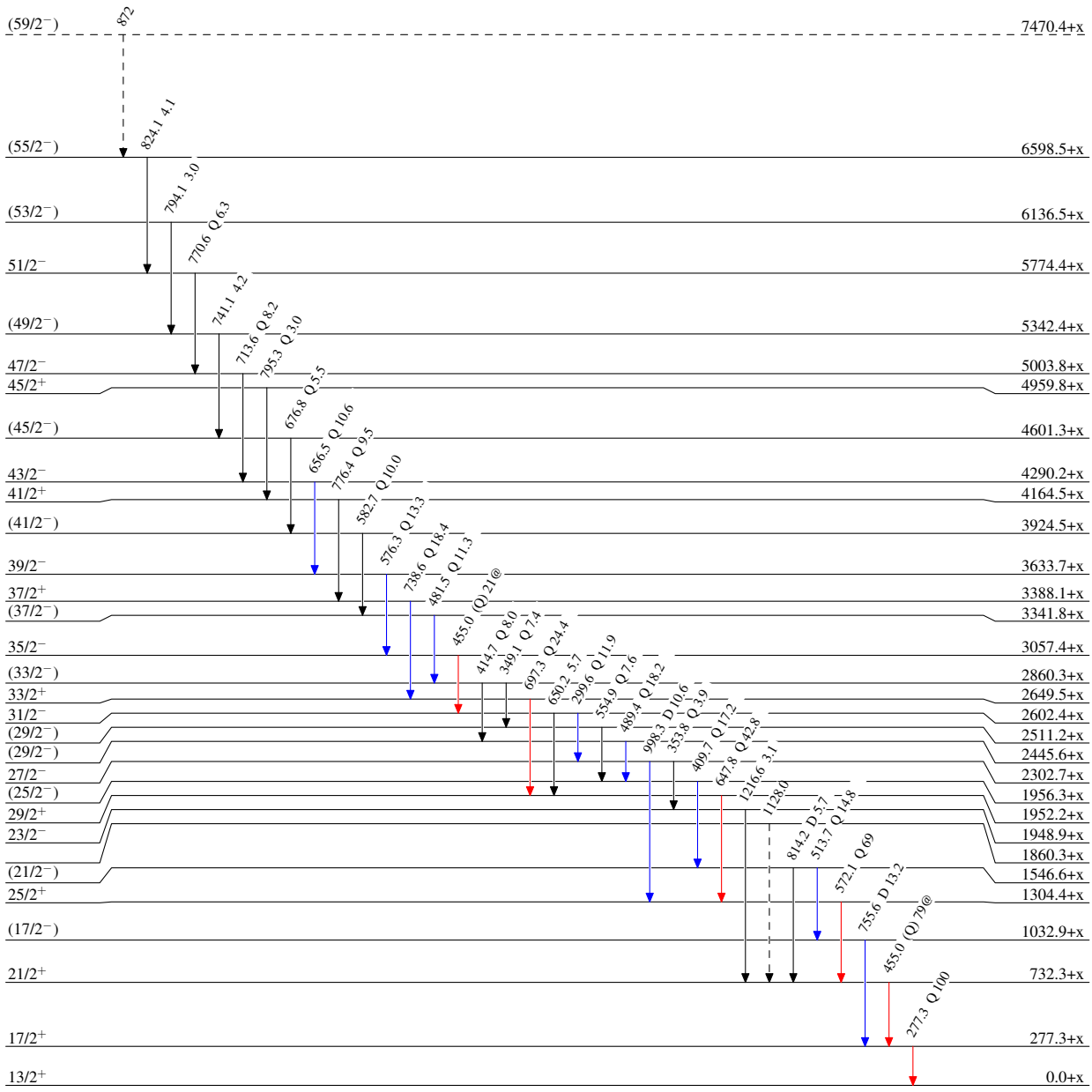
Legend

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

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

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

γ Decay (Uncertain)



$^{165}_{74}W_{91}$

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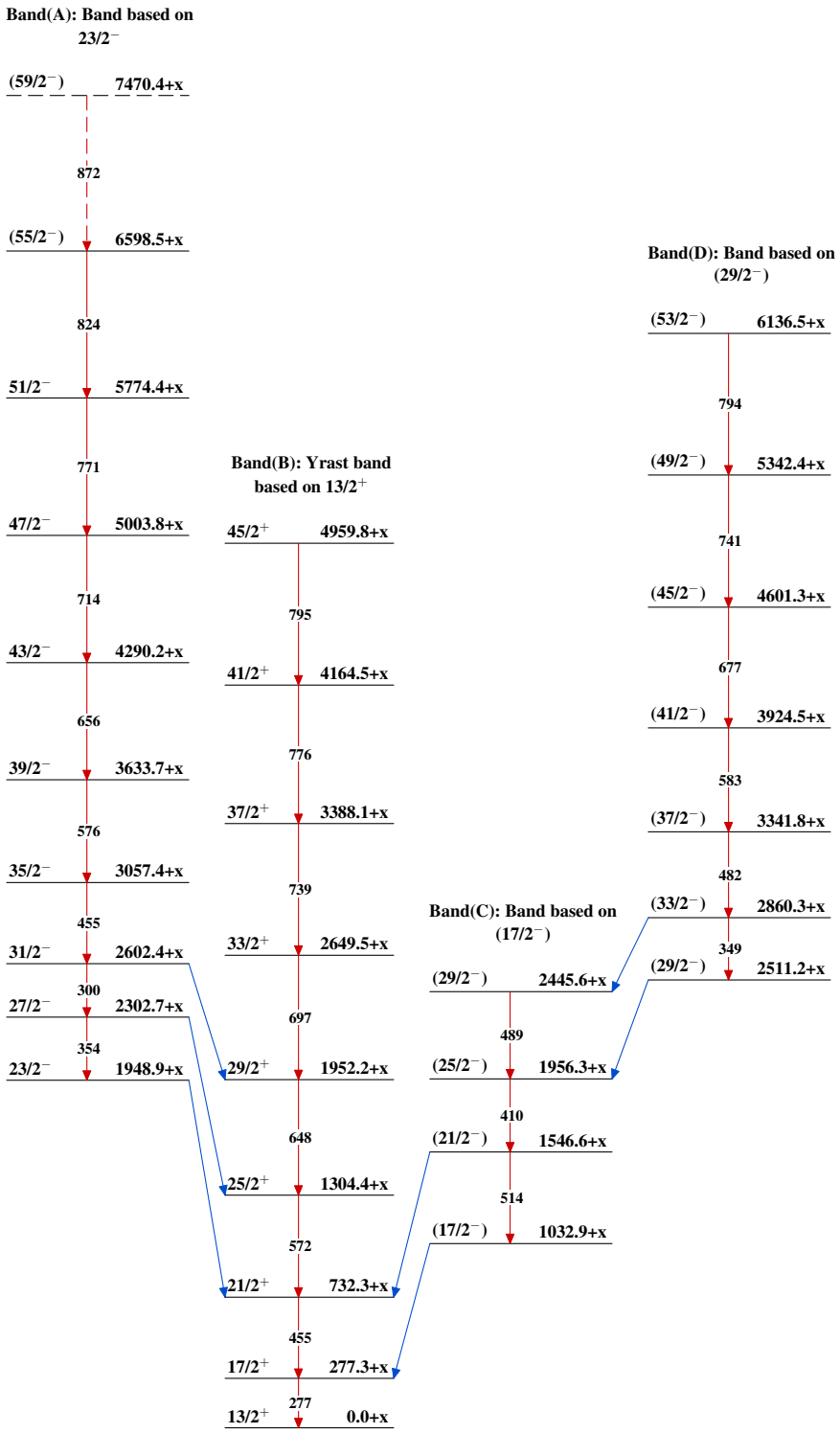

$^{165}_{74}W_{91}$