^{104}Pd(^{37}Cl,2npγ) 1987Pa30

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 146, 1 (2017)	30-Sep-2017

1987Pa30: E=170 MeV ^{37}Cl beam was produced from the Stony Brook Superconducting LINAC injected by tandem Van de Graaff accelerator, incident on a palladium target of 2 mg/cm^2 ^{104}Pd rolled onto a 50 mg/cm^2 thick lead backing. γ rays were detected with four Compton-suppressed Ge detectors. Measured Eγ, Iγ, γγ-coin, γ(DCO). Deduced levels, J, π, configurations, band structures. Comparisons with shell-model calculations.

^{138}Sm Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0[a]	0+	2351.4[a] 4	8+	3818.6[b] 5	12+	5437.8[b] 6	(16+)
346.62[a] 16	2+	2500.8[c] 4	7+	3916.4[@] 5	14+	5859.2[#] 12	(17−)
745.68[c] 16	2+	2508.1[#] 4	(7−)	4341.3[#] 5	(13−)	5935.3[@] 12	(18+)
890.8[a] 3	4+	2651.6[c] 4	(8+)	4486.7 9	(14+)	6014.8[&] 6	(20+)
1083.75[c] 20	3+	2903.5[@] 5	10+	4613.8[b] 5	(14+)	6886.8[&] 12	(22+)
1398.4[c] 3	4+	3028.4[#] 4	(9−)	4778.7[&] 6	16+	7916.9 16	(24+)
1576.2[a] 4	6+	3105.8[b] 5	10+	4831.3[@] 6	16+		
1732.6[c] 3	5+	3259.8[@] 5	12+	5074.2[#] 6	(15−)		
2104.5[c] 4	6+	3639.6[#] 5	(11−)	5325.9[&] 6	18+		

† From a least-squares fit to γ-ray energies.
‡ From 1987Pa30 based on deduced γ multipolarities from DCO ratios, band energy and intensity pattern.
[#] Band(A): band 1. Configuration=((π $h_{11/2}$)(π $g_{7/2}$)).
[@] Band(B): band 2. Configuration=(π $h_{11/2}$)^2.
[&] Band(C): band 3. Configuration=((π $h_{11/2}$)^2(ν $h_{11/2}$)^2).
[a] Band(D): band 4. g.s. band.
[b] Band(E): band 5. Configuration=(ν $h_{11/2}$)^2.
[c] Band(F): band 6. γ-vibrational band.

γ(^{138}Sm)

Eγ†	Iγ†	Ei(level)	Jiπ	Ef	Jfπ	Mult.‡	Comments
338.0 2	4.1 1	1083.75	3+	745.68	2+		
346.6 2	110.8 9	346.62	2+	0	0+	E2	R(DCO)=1.01 3 (1987Pa30).
356.3 2	42.7 7	3259.8	12+	2903.5	10+	E2	R(DCO)=1.02 3 (1987Pa30).
399.0 2	9.4 5	745.68	2+	346.62	2+		
494.6 2	2.1 4	5325.9	18+	4831.3	16+		
507 1		1398.4	4+	890.8	4+		Eγ: doublet with 511-keV β peak (1987Pa30).
520.3 2	5.3 4	3028.4	(9−)	2508.1	(7−)	E2	R(DCO)=0.99 18 (1987Pa30).
544.2 2	100.0 11	890.8	4+	346.62	2+	E2	R(DCO)=1.08 3 (1987Pa30).
547.1 2	5.1 5	2651.6	(8+)	2104.5	6+		R(DCO)=0.99 8 (1987Pa30).
547.2 2		5325.9	18+	4778.7	16+		
552.1 2	42.5 8	2903.5	10+	2351.4	8+	E2	R(DCO)=1.14 7 (1987Pa30).
611.2 2	8.9 5	3639.6	(11−)	3028.4	(9−)	E2	R(DCO)=1.01 11 (1987Pa30).
648.8 2	5.7 5	1732.6	5+	1083.75	3+		
652.7 2	3.4 5	1398.4	4+	745.68	2+		
656.6 2	28.5 7	3916.4	14+	3259.8	12+	E2	R(DCO)=0.97 5 (1987Pa30).
668 1	<1.0	4486.7	(14+)	3818.6	12+		
677.0 2	3.9 4	3028.4	(9−)	2351.4	8+	(E1)	R(DCO)=0.78 15 (1987Pa30).
685.4 2	86.0 11	1576.2	6+	890.8	4+	E2	R(DCO)=1.09 3 (1987Pa30).

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^{104}Pd(^{37}Cl,2npγ) 1987Pa30 (continued)

γ(^{138}Sm) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
688.9 *2*	1.6 *5*	6014.8	(20^+)	5325.9	18^+		
701.6 *2*	7.9 *5*	4341.3	(13^-)	3639.6	(11^-)	E2	R(DCO)=1.22 *17* (1987Pa30).
706.1 *2*	3.9 *5*	2104.5	6^+	1398.4	4^+		
712.8 *2*	8.8 *6*	3818.6	12^+	3105.8	10^+	E2	R(DCO)=1.02 *13* (1987Pa30).
732.9 *2*	8.7 *13*	5074.2	(15^-)	4341.3	(13^-)	E2	R(DCO)=0.96 *19* (1987Pa30).
737.2 *2*	5.2 *5*	1083.75	3^+	346.62	2^+		
745.7 *2*	<1.0	745.68	2^+	0	0^+		
754.3 *2*	13.2 *7*	3105.8	10^+	2351.4	8^+	E2	R(DCO)1.20 *10* (1987Pa30).
768.2 *2*	5.1 *5*	2500.8	7^+	1732.6	5^+		
775.2 *2*	68.7 *11*	2351.4	8^+	1576.2	6^+	E2	R(DCO)=1.01 *3* (1987Pa30).
785 *1*	2.5 *4*	5859.2	(17^-)	5074.2	(15^-)		
795.2 *2*	5.5 *5*	4613.8	(14^+)	3818.6	12^+		
824.0 *2*	1.5 *5*	5437.8	(16^+)	4613.8	(14^+)		
862.3 *2*	6.4 *7*	4778.7	16^+	3916.4	14^+	E2	R(DCO)=0.95 *19* (1987Pa30).
872 *1*	<1.0	6886.8	(22^+)	6014.8	(20^+)		
914.9 *2*	10.8 *7*	4831.3	16^+	3916.4	14^+	E2	R(DCO)=1.09 *12* (1987Pa30).
931.9 *2*	6.4 *7*	2508.1	(7^-)	1576.2	6^+	(E1)	R(DCO)=0.70 *13* (1987Pa30).
1030 *1*	<1.0	7916.9	(24^+)	6886.8	(22^+)		
1074[#] *1*	2.3 *6*	2651.6	(8^+)	1576.2	6^+		
1104 *1*	1.8 *6*	5935.3	(18^+)	4831.3	16^+		
1227 *1*	2.3 *5*	4486.7	(14^+)	3259.8	12^+		

[†] From 1987Pa30. Intensities are relative to Iγ(544.2γ)=100.

[‡] Deduced based on measured DCO ratios from 1987Pa30. DCO ratios were obtained as R(DCO)=Iγ(136°)/Iγ(57°), with respect to beam direction, by gating on E2 transitions. Expected values are >1.0 for stretched quadrupole and <0.8 for pure stretched dipole (1987Pa30). Stretched Q transitions are assigned E2 and stretched D are assigned E1.

[#] Placement of transition in the level scheme is uncertain.

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Level Scheme

Intensities: Relative I_γ

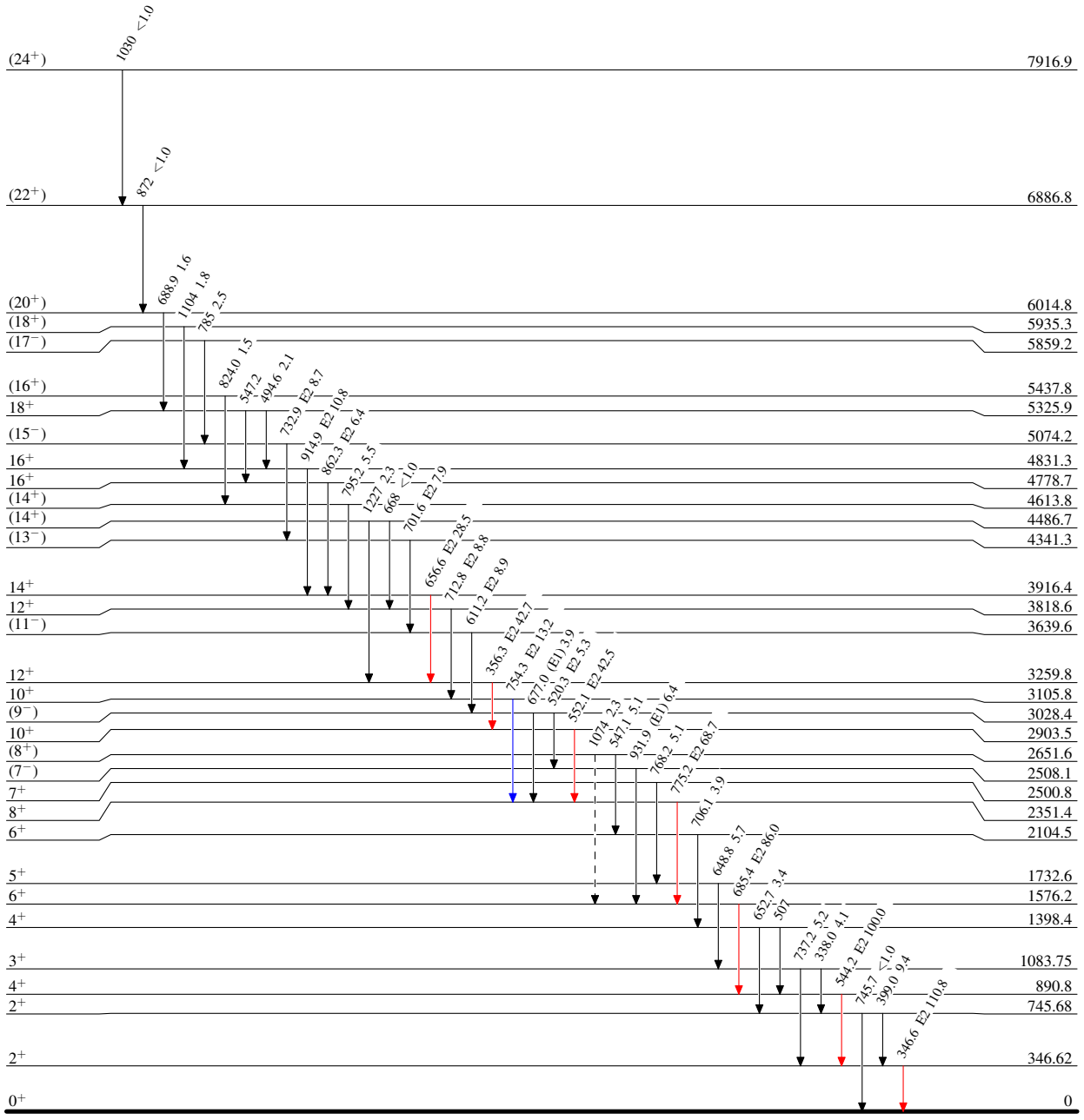
Legend

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

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

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

γ Decay (Uncertain)



$^{138}_{62}Sm_{76}$

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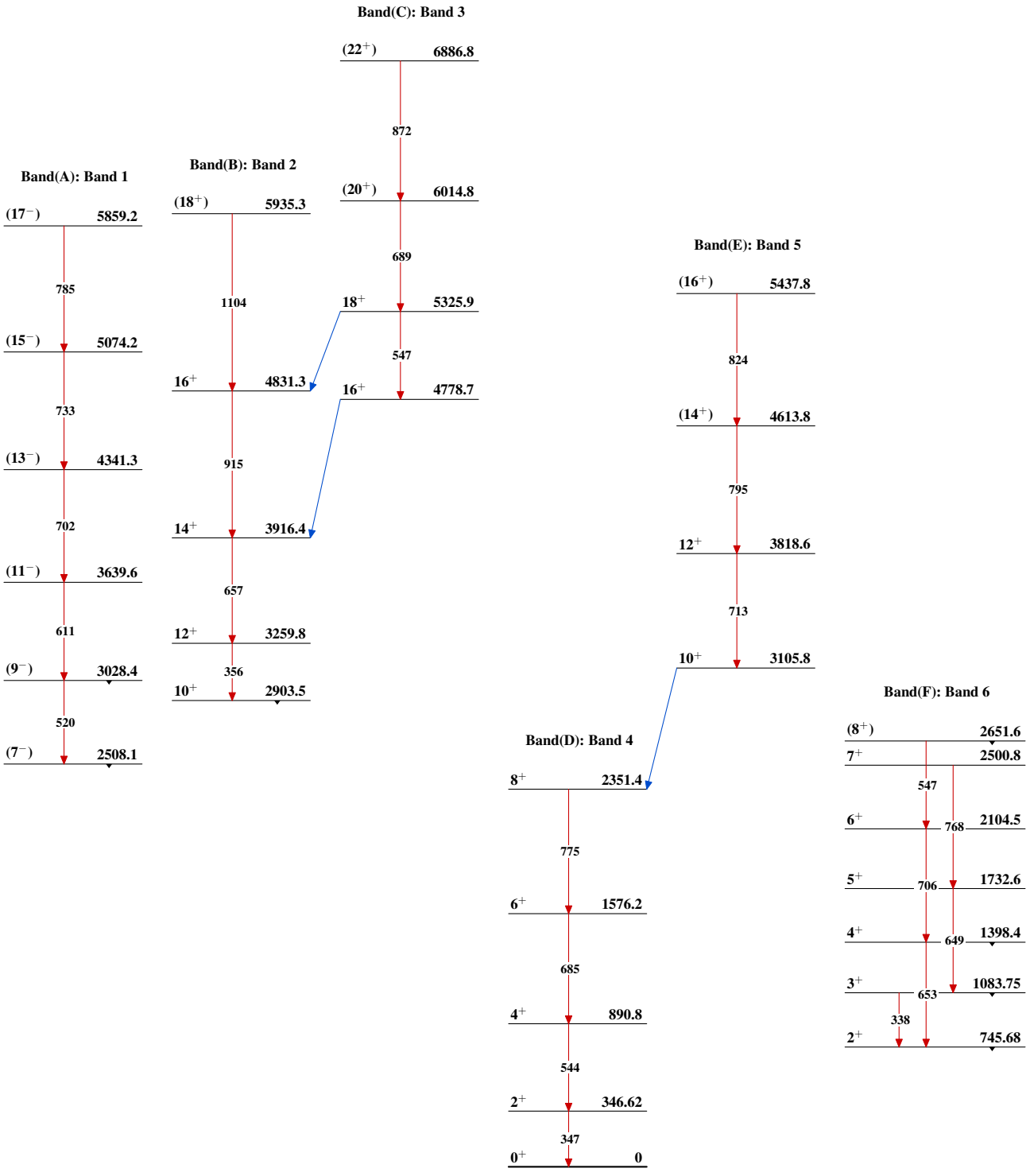

$^{138}_{62}Sm_{76}$