^{116}Cd(^{27}Al,5nγ) 1990Be28

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

1990Be28: E=124 and 129 MeV ^{27}Al beam was produced from the Stony Brook Superconducting LINAC injected by the Tandem Van de Graaff accelerator. Target was 2.3 mg/cm^2 enriched ^{116}Cd on 50 mg/cm^2 natural lead backing. γ rays were detected with BGO-suppressed Ge detectors. Measured Eγ, Eγ, $\gamma\gamma$-coin, $\gamma(\theta)$, γ(t). Deduced levels, J, π, band structures, configurations. Comparisons with shell-model calculations.

^{138}Pm Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	Comments
0+x	5$^-$		Additional information 1.
150.15+x	6$^-$		
327.77+x[&]	(6$^-$)		
411.15+x	7$^-$		
584.89+x[@]	8$^+$	21 ns *5*	T$_{1/2}$: from γ(t) in 1990Be28.
618.7+x[a]	(8$^-$)		
705.5+x[#]	9$^+$		
763.29+x[&]	(8$^-$)		
1045.1+x[a]	(9$^-$)		
1062.5+x[@]	10$^+$		
1165.6+x[&]	(10$^-$)		
1383.9+x[a]	(10$^-$)		
1412.1+x[#]	11$^+$		
1858.6+x[a]	(11$^-$)		
1864.0+x[&]	(12$^-$)		
1889.0+x[@]	12$^+$		
2281.4+x[#]	13$^+$		
2367.9+x[a]	(12$^-$)		
2409.0+x			
2474.9+x[&]	(14$^-$)		
2797.0+x			
2827.6+x[@]	14$^+$		
2832.9+x[a]	(13$^-$)		
3006.0+x			
3064.2+x[a]	(14$^-$)		
3073.4+x[&]	(16$^-$)		
3277.3+x[#]	15$^+$		
3305.6+x[a]	(15$^-$)		
3593.8+x[a]	(16$^-$)		
3772.4+x[&]	(18$^-$)		
3853.7+x[@]	16$^+$		
3976.4+x[a]	(17$^-$)		
4337.7+x[#]	(17$^+$)		
4375.4+x[a]	(18$^-$)		
4624.4+x[&]	(20$^-$)		
y[b]			Additional information 2.
554.70+y[b]			

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^{116}Cd(^{27}Al,5nγ) 1990Be28 (continued)

^{138}Pm Levels (continued)

E(level)[†]
1281.4+y[b]
2143.4+y[b]

[†] From a least-squares fit to γ-ray energies.
[‡] As given by 1990Be28, based on the assignment of $J^{\pi}=8^{+}$ to the bandhead of the yrast band and band structures.
[#] Band(A): Yrast band, α=1. Configuration=$\pi h_{11/2}\otimes\nu h_{11/2}$.
[@] Band(a): Yrast band, α=0. Configuration=$\pi h_{11/2}\otimes\nu h_{11/2}$.
[&] Band(B): $\pi h_{11/2}\otimes\nu 1/2[400]$ band.
[a] Band(C): $\pi 5/2[413]\otimes\nu h_{11/2}$ band.
[b] Band(D): Unknown band that feeds yrast band.

γ(^{138}Pm)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
120.6 *2*	38 *1*	705.5+x	9^+	584.89+x	8^+	A_2=−0.24 *3* (1990Be28)
150.0 *2*	93 *2*	150.15+x	6^-	0+x	5^-	A_2=−0.05 *3* (1990Be28)
173.6 *2*	100	584.89+x	8^+	411.15+x	7^-	A_2=−0.02 *3* (1990Be28)
177.6 *2*		327.77+x	(6^-)	150.15+x	6^-	A_2=−0.08 *4* (1990Be28)
178.3 *2*	19 *1*	763.29+x	(8^-)	584.89+x	8^+	
231 *1*	4 *1*	3064.2+x	(14^-)	2832.9+x	(13^-)	
241.4 *2*	6 *1*	3305.6+x	(15^-)	3064.2+x	(14^-)	
260.9 *2*	84 *8*	411.15+x	7^-	150.15+x	6^-	A_2=−0.10 *3* (1990Be28)
288.2 *2*	6 *1*	3593.8+x	(16^-)	3305.6+x	(15^-)	
349.6 *2*	20 *1*	1412.1+x	11^+	1062.5+x	10^+	A_2=−0.40 *4* (1990Be28)
352.3 *2*	13 *1*	763.29+x	(8^-)	411.15+x	7^-	
357.0 *2*	39 *3*	1062.5+x	10^+	705.5+x	9^+	A_2=−0.40 *3* (1990Be28)
382.6 *2*	6 *1*	3976.4+x	(17^-)	3593.8+x	(16^-)	
392.4 *2*	13 *1*	2281.4+x	13^+	1889.0+x	12^+	
399[†] *1*		4375.4+x	(18^-)	3976.4+x	(17^-)	
402.3 *2*	17 *1*	1165.6+x	(10^-)	763.29+x	(8^-)	
411.3 *2*	27 *1*	411.15+x	7^-	0+x	5^-	A_2=+0.08 *4* (1990Be28)
426.3 *5*		1045.1+x	(9^-)	618.7+x	(8^-)	
435.5 *2*	7 *1*	763.29+x	(8^-)	327.77+x	(6^-)	
451[†] *1*	7 *1*	1864.0+x	(12^-)	1412.1+x	11^+	
451 *1*		3277.3+x	15^+	2827.6+x	14^+	
460 *1*		1165.6+x	(10^-)	705.5+x	9^+	
468.5 *2*	14 *1*	618.7+x	(8^-)	150.15+x	6^-	
477.1 *2*	15 *1*	1889.0+x	12^+	1412.1+x	11^+	A_2=−0.31 *4* (1990Be28)
484[†] *1*		4337.7+x	(17^+)	3853.7+x	16^+	
545 *1*		2409.0+x		1864.0+x	(12^-)	
546 *1*	11 *1*	2827.6+x	14^+	2281.4+x	13^+	
554.7 *2*	15 *2*	554.70+y		y		
576 *1*		3853.7+x	16^+	3277.3+x	15^+	
597 *1*	3 *1*	3006.0+x		2409.0+x		
598.5 *5*	5 *1*	3073.4+x	(16^-)	2474.9+x	(14^-)	
610.9 *2*	6 *1*	2474.9+x	(14^-)	1864.0+x	(12^-)	
634 *1*		1045.1+x	(9^-)	411.15+x	7^-	
698.7 *5*		1864.0+x	(12^-)	1165.6+x	(10^-)	
699 *1*	16 *1*	3772.4+x	(18^-)	3073.4+x	(16^-)	

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^{116}Cd(^{27}Al,5nγ) 1990Be28 (continued)

$\gamma(^{138}Pm)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
706.5 *2*	13 *1*	1412.1+x	11^+	705.5+x	9^+	
726.7 *2*	6 *1*	1281.4+y		554.70+y		
765.2 *5*	4 *1*	1383.9+x	(10^-)	618.7+x	(8^-)	
783† *1*		3064.2+x	(14^-)	2281.4+x	13^+	
813.5 *5*		1858.6+x	(11^-)	1045.1+x	(9^-)	
826.5 *2*	10 *1*	1889.0+x	12^+	1062.5+x	10^+	A_2=+0.06 *7* (1990Be28)
852† *1*		4624.4+x	(20^-)	3772.4+x	(18^-)	
862 *1*	3 *1*	2143.4+y		1281.4+y		
869.3 *2*	12 *1*	2281.4+x	13^+	1412.1+x	11^+	A_2=+0.11 *7* (1990Be28)
933 *1*	3 *1*	2797.0+x		1864.0+x	(12^-)	A_2=+0.28 *8* (1990Be28)
938.6 *2*	10 *1*	2827.6+x	14^+	1889.0+x	12^+	
974 *1*		2832.9+x	(13^-)	1858.6+x	(11^-)	
984 *1*		2367.9+x	(12^-)	1383.9+x	(10^-)	
995.4 *5*	5 *1*	3277.3+x	15^+	2281.4+x	13^+	
1026.2 *5*	4 *1*	3853.7+x	16^+	2827.6+x	14^+	

† Placement of transition in the level scheme is uncertain.

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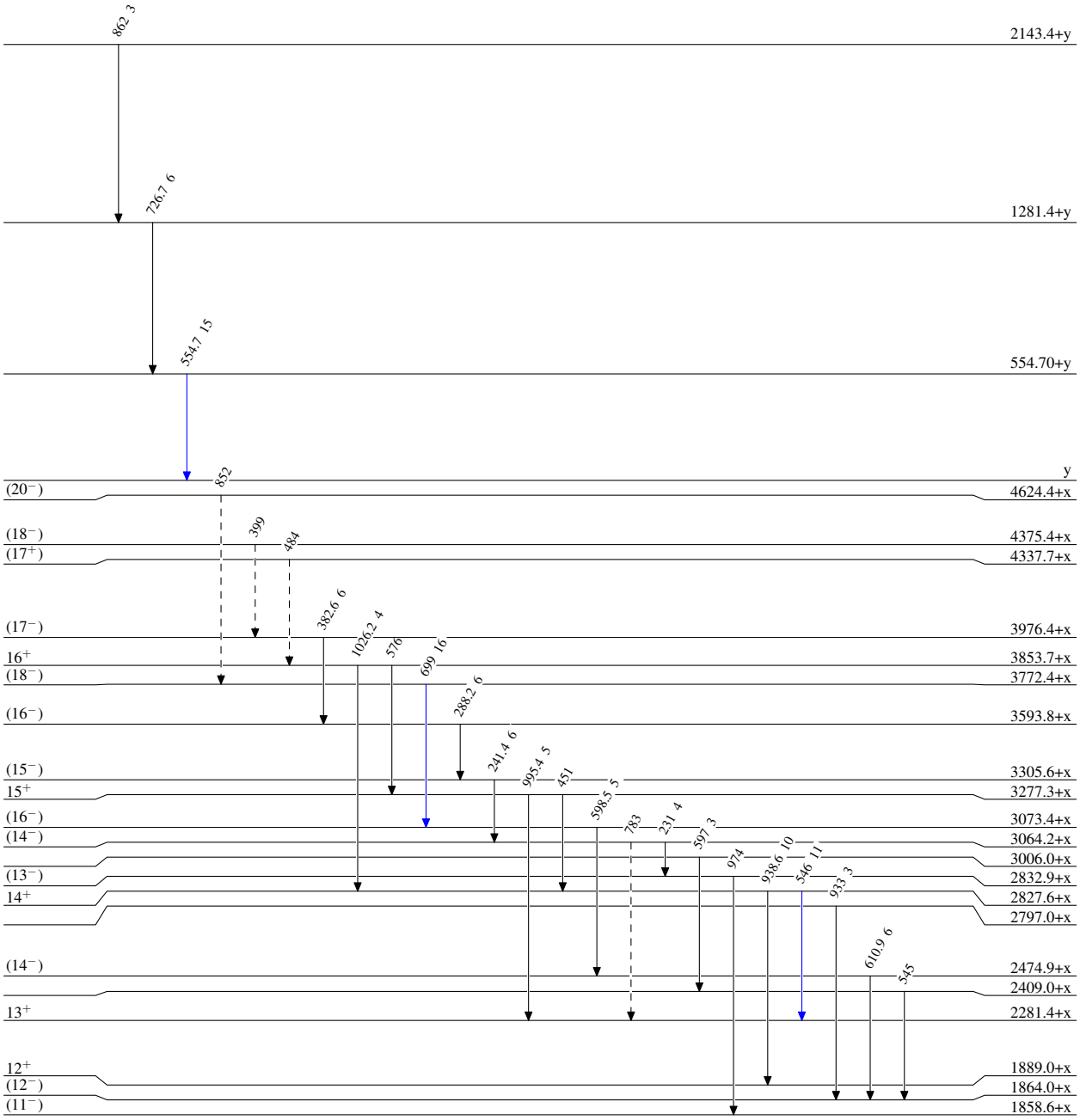
Level Scheme

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)



$^{138}_{61}Pm_{77}$

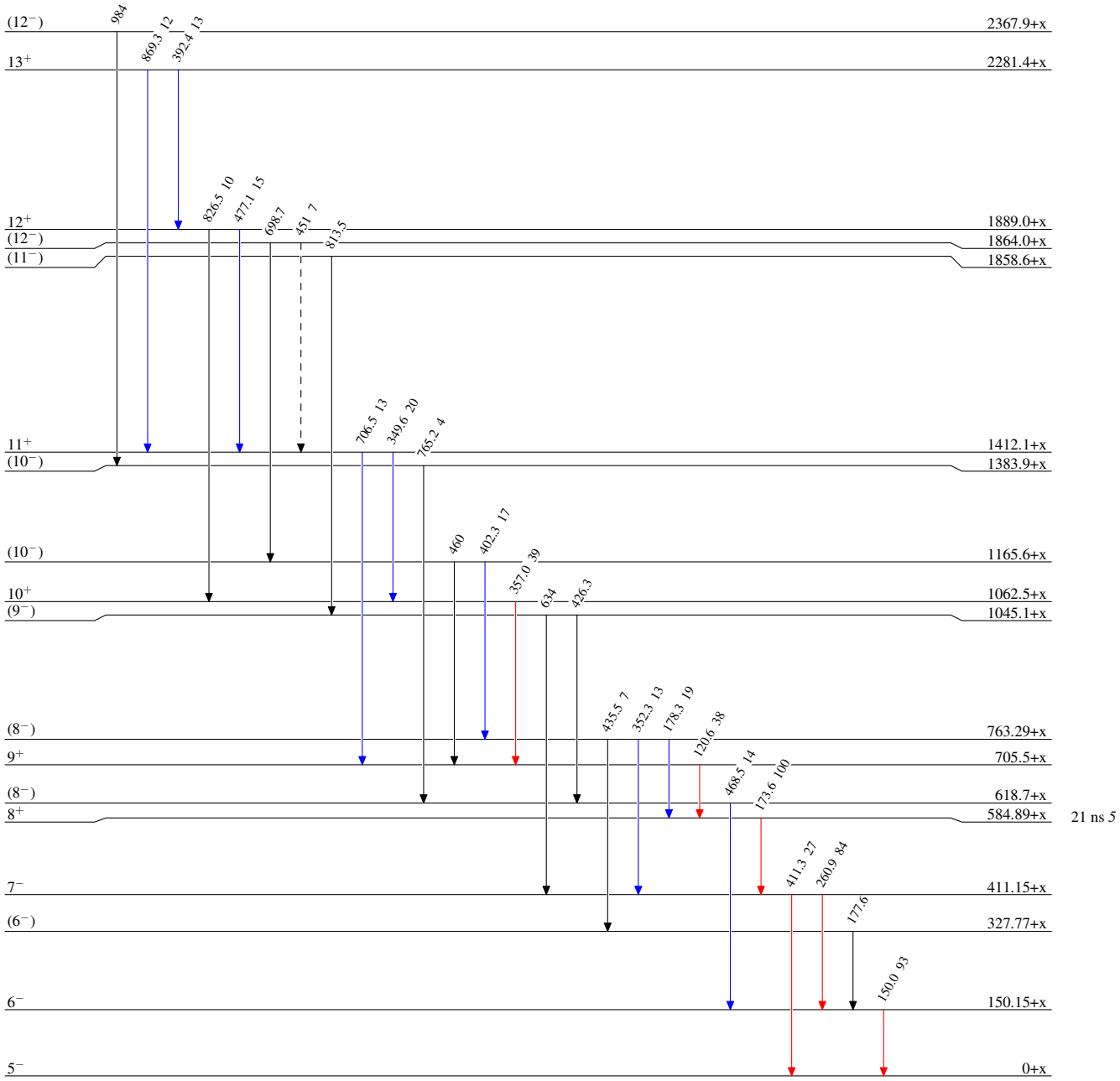
^{116}Cd(^{27}Al,5nγ) 1990Be28

Level Scheme (continued)

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)



$^{138}_{61}Pm_{77}$

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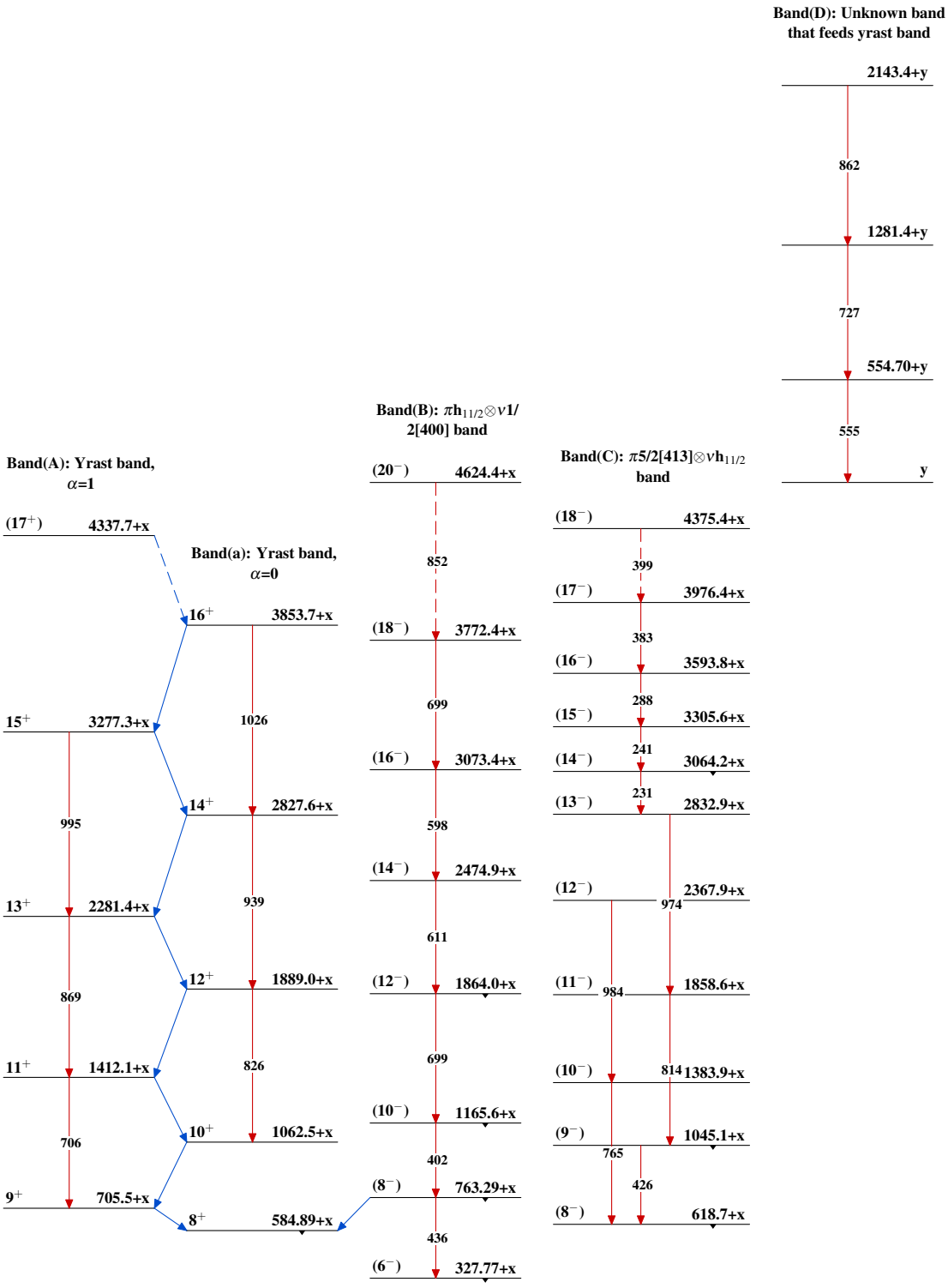

$^{138}_{61}Pm_{77}$