Coulomb excitation 2010Ha24

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin, C. D. Nesaraja	NDS 186, 261 (2022)	31-Dec-2021

The evaluators have made use of the XUNDL dataset compiled by B. Singh (McMaster) Nov 25, 2010.
Beam=^{40}Ar at 170.5 MeV from ATLAS facility at ANL. target=≈98% enriched ^{242m}Am isomer ($T_{1/2}$=141 y). Measured Eγ, Iγ, γγ coin using the Gammasphere array with 101 Compton-suppressed HPGe detectors and LEPS detectors for high resolution combined with CHICO particle detector. The authors also measured Coulomb excitation γ-ray yields from (particle)γ coin data.

^{242}Am Levels

E(level)†	Jπ‡	$T_{1/2}$#	Comments
48.603& *9*	5^-	141 y *2*	%IT=99.550 *10*; %α=0.450 *10* E(level),%IT,%α: From Adopted Levels.
100.1[a] *7*	6^-		
114[@]	6^-		
172[b]	7^-		
181.4[d] *10*	(5^+)		
181.4+x?[d]	(7^+)		
190.6& *5*	7^-		
247+x[c]	(8^+)		
254.3[a]	8^-		
276[@]	8^-		
323.4+x?[d]	(9^+)		
347[b]	9^-		
373.3& *7*	9^-		
409+x[c]	(10^+)		
448.9[a]	10^-		
479[@]	10^-		
505.4+x?[d]	(11^+)		
561[b]	11^-		
596.2& *9*	11^-		
603+x?[f]			
611+x[c]	(12^+)		
682.7[a]	12^-		
692+x?[e]			
722[@]	12^-		
727.4+x?[d]	(13^+)		
794+x?[f]			
814[b]	13^-		
852+x[c]	(14^+)		
858.0& *10*	13^-		
904+x?[e]			
954.1[a]	14^-		
988.6+x?[d]	(15^+)		
1002[@]	14^-		
1024+x[f]			
1103[b]	15^-		
1132+x[c]	(16^+)		
1151+x[e]			

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Coulomb excitation 2010Ha24 (continued)

^{242}Am Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
1156.1[&] *11*	15⁻	1287.6+x?[d]	(17⁺)	1434+x[e]		1587+x?[f]	
1260.9[a]	16⁻	1316[@]	16⁻	1453+x[c]	(18⁺)	1599.0[a]	18⁻
1287+x[f]		1426[b]	17⁻	1482.8[&] *12*	17⁻	1652[@]	18⁻

† Energies of the odd-J members of the $K^\pi=5^-$ band are from the cascade of intraband transitions built on the $J^\pi=5^-$ bandhead with energy 48.603 from Adopted Levels. Energies of the even-J members of the $K^\pi=6^-$ band are likewise from the cascade of intraband transitions built on the $J^\pi=6^-$ bandhead with energy 100.1 *7* given by the authors in the text. Here, however, the evaluators assign no uncertainties since the paths used to get the bandhead energy are not specified, but involve some of the higher band members whose energies are given only to the nearest keV. E=100.4 is given in the authors′ Table I but without an uncertainty. The interband transitions are quoted only to the nearest keV and the authors state that the excitation energies have uncertainties ≤2 keV. Other excitation energies are as given by the authors in their Fig. 3 or as deduced by the evaluators from the interband transitions also from Fig. 3.

‡ From the band assignments of 2010Ha24 based on observations of cascade transitions in gated spectra, energy spacing, and inertial parameters. For the band built on the 141-y isomer the authors extend the band established in (d,p), (d,t).

From Adopted Levels.

@ Band(A): $K^\pi=5^-$ (ν 5/2[622]). α=0.

& Band(a): $K^\pi=5^-$ (π 5/2[523]+ν 5/2[622]). α=1.

a Band(B): $K^\pi=6^-$ (π 5/2[523]+ν 7/2[624]). α=0.

b Band(b): $K^\pi=6^-$ (π 5/2[523]+ν 7/2[624]). α=1.

c Band(C): $K^\pi=(5^+)$ (π 5/2[642]+ν 5/2[622]). α=0 (?).

d Band(c): $K^\pi=(5^+)$ (π 5/2[642]+ν 5/2[622]). α=1 (?).

e Band(D): Unspecified sequence.

f Band(d): Unspecified sequence.

$\gamma(^{242}Am)$

Eγ‡	Ei(level)	Jiπ	Ef	Jfπ	Mult.	α@	Comments
82[&]	254.3	8⁻	172	7⁻			
90	190.6	7⁻	100.1	6⁻			
92[&]	347	9⁻	254.3	8⁻			
97	373.3	9⁻	276	8⁻			
112	561	11⁻	448.9	10⁻			
126	722	12⁻	596.2	11⁻			
131	814	13⁻	682.7	12⁻			
132.8 *5*	181.4	(5⁺)	48.603	5⁻	(E1)	0.268 *4*	α(K)=0.2029 *33*; α(L)=0.0492 *8*; α(M)=0.01209 *21* α(N)=0.00327 *6*; α(O)=0.000796 *14*; α(P)=0.0001366 *23*; α(Q)=5.59×10⁻⁶ *9* Mult.: From Iγ=53% *8* relative to the 10⁻ to 8⁻ $K^\pi=5^-$ transition. Any higher mult would indicate that the $K^\pi=(5^+)$ band was being populated more strongly than the $K^\pi=5^-$ band, a result in conflict with the observed intensities of the $K^\pi=(5^+)$ band being ≈1% of the $K^\pi=5^-$ transitions.
133	479	10⁻	347	9⁻			
136	858.0	13⁻	722	12⁻			
140	954.1	14⁻	814	13⁻			
142.0 *5*	323.4+x?	(9⁺)	181.4+x?	(7⁺)			
142.0 *5*	190.6	7⁻	48.603	5⁻			
144	1002	14⁻	858.0	13⁻			

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Coulomb excitation **2010Ha24** **(continued)**

$\gamma(^{242}Am)$ (continued)

E_γ ‡	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
147		596.2	11^-	448.9	10^-
149		1103	15^-	954.1	14^-
154		1156.1	15^-	1002	14^-
154.2 *5*		254.3	8^-	100.1	6^-
162.1 *5*		409+x	(10^+)	247+x	(8^+)
162.3 *5*		276	8^-	114	6^-
174.4 *5*		347	9^-	172	7^-
182.0 *5*		505.4+x?	(11^+)	323.4+x?	(9^+)
182.7 *5*		373.3	9^-	190.6	7^-
188		1002	14^-	814	13^-
194.6 *5*		448.9	10^-	254.3	8^-
202.2 *5*		611+x	(12^+)	409+x	(10^+)
202.9 *5*		479	10^-	276	8^-
x209.9#	0.0037# *5*				
214.4 *5*		561	11^-	347	9^-
222.0 *5*		727.4+x?	(13^+)	505.4+x?	(11^+)
222.9 *5*		596.2	11^-	373.3	9^-
233.8 *5*		682.7	12^-	448.9	10^-
241.1 *5*		852+x	(14^+)	611+x	(12^+)
242.5 *5*		722	12^-	479	10^-
252.8 *5*		814	13^-	561	11^-
261.2 *5*		988.6+x?	(15^+)	727.4+x?	(13^+)
261.8 *5*		858.0	13^-	596.2	11^-
271.4 *5*		954.1	14^-	682.7	12^-
280		1132+x	(16^+)	852+x	(14^+)
280.5 *5*		1002	14^-	722	12^-
289.4 *5*		1103	15^-	814	13^-
298.1 *5*		1156.1	15^-	858.0	13^-
299		1287.6+x?	(17^+)	988.6+x?	(15^+)
306.8 *5*		1260.9	16^-	954.1	14^-
314.2 *5*		1316	16^-	1002	14^-
321		1453+x	(18^+)	1132+x	(16^+)
323.1 *5*		1426	17^-	1103	15^-
326.7 *5*		1482.8	17^-	1156.1	15^-
335.2 *5*		1652	18^-	1316	16^-
338.1 *5*		1599.0	18^-	1260.9	16^-
356&		603+x?		247+x	(8^+)
369&		692+x?		323.4+x?	(9^+)
385&		794+x?		409+x	(10^+)
399&		904+x?		505.4+x?	(11^+)
413		1024+x		611+x	(12^+)
x417.1#	0.0038# *6*				
422&		603+x?		181.4+x?	(7^+)
424		1151+x		727.4+x?	(13^+)
435		1287+x		852+x	(14^+)
x442.0#	0.0103# *11*				
445&		692+x?		247+x	(8^+)
445		1434+x		988.6+x?	(15^+)
x449.3#	0.0034# *5*				
455&		1587+x?		1132+x	(16^+)
x459.0#	0.0085# *9*				
471&		794+x?		323.4+x?	(9^+)

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Coulomb excitation 2010Ha24 (continued)

$\gamma(^{242}Am)$ (continued)

E_γ ‡	I_γ †	E_i(level)	E_f	J_f^π	E_γ ‡	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
x477.1#	0.0057# *8*				540		1151+x		611+x	(12^+)
495&		904+x?	409+x	(10^+)	560		1287+x		727.4+x?	(13^+)
x505.8#	0.0063# *8*				581&		1434+x		852+x	(14^+)
519		1024+x	505.4+x?	(11^+)	x653.5#	0.0028# *7*				
x533.7#	0.0053# *7*				x662.9#	0.0035# *6*				

† The γ-ray intensity data for transitions in the authors′ level scheme, Fig 3, are not available; however, the authors state that intensities of the transitions in the tentative $K^\pi=(5^+)$ band are about 1% of those of the 10^- to 8^- transition in the $K^\pi=5^-$ band.

‡ The evaluators have assigned an uncertainty of 0.5 keV to the in-band transitions based on the authors′ statement that the uncertainty in these transitions is <0.5 keV.

This transition is tentatively determined to directly or indirectly feed the tentative $K^\pi=5^+$ band (bandhead at 182 keV), a determination based on observed coincidences with the 132.8-keV $K^\pi=(5^+)$ to $K^\pi=5^-$ transition. The intensity is approximate and is given relative to the 202.9-keV, 10^- to 8^- transition in the $K^\pi=5^-$ band.

@ Additional information 1.

& Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

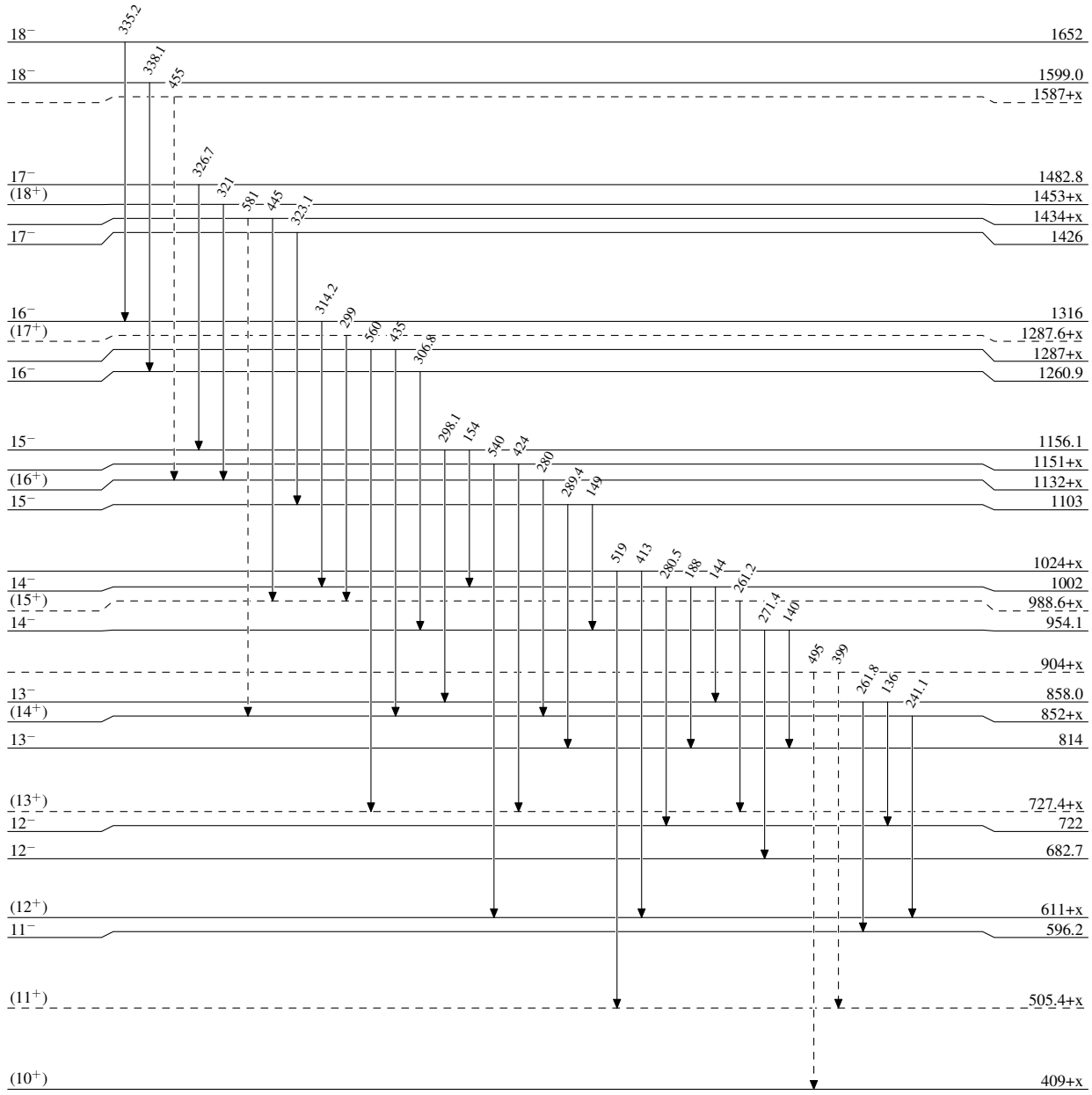
Coulomb excitation 2010Ha24

Legend

Level Scheme

Intensities: Relative I_γ

γ Decay (Uncertain)



$^{242}_{95}Am_{147}$

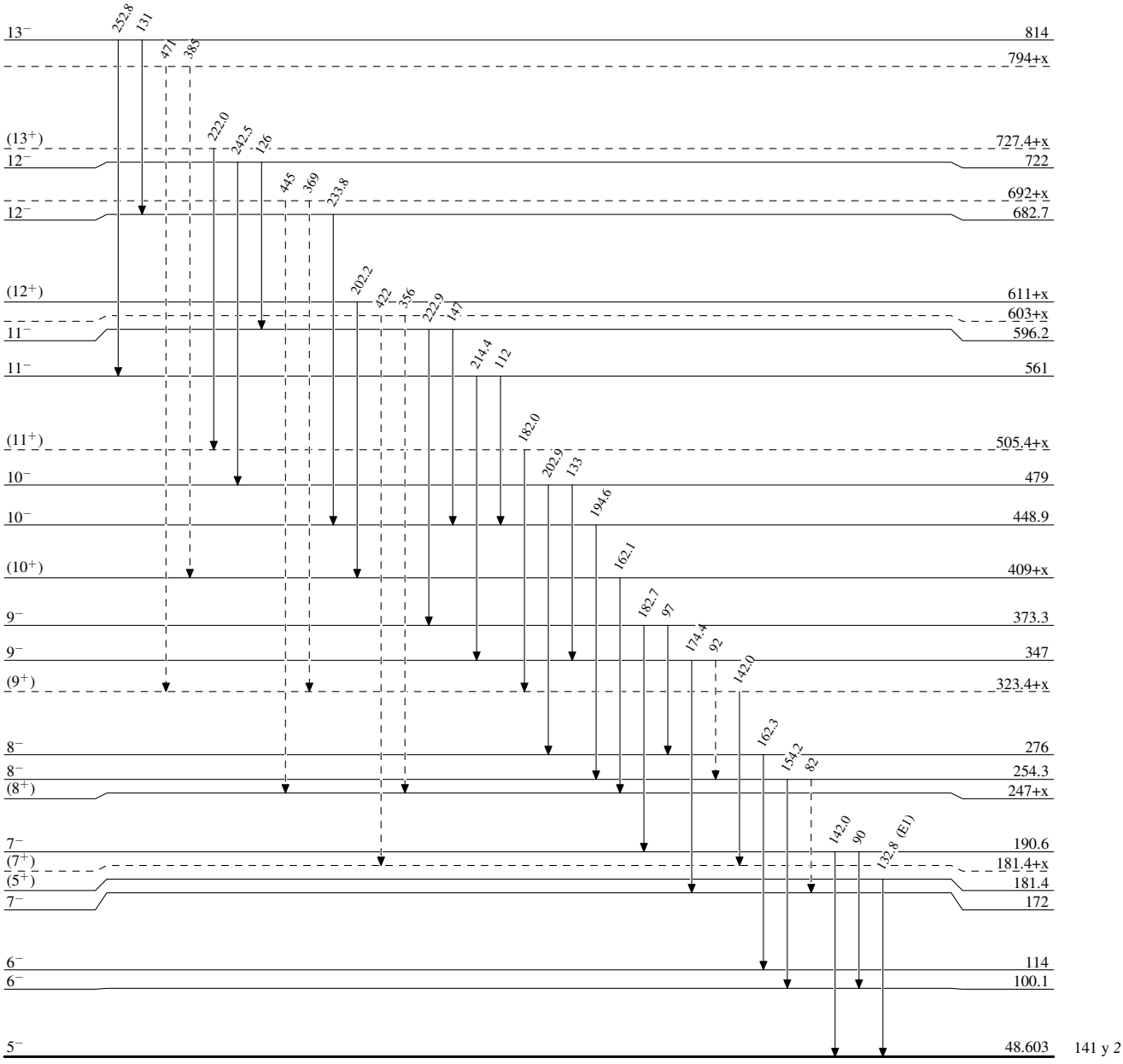
Coulomb excitation 2010Ha24

Legend

Level Scheme (continued)

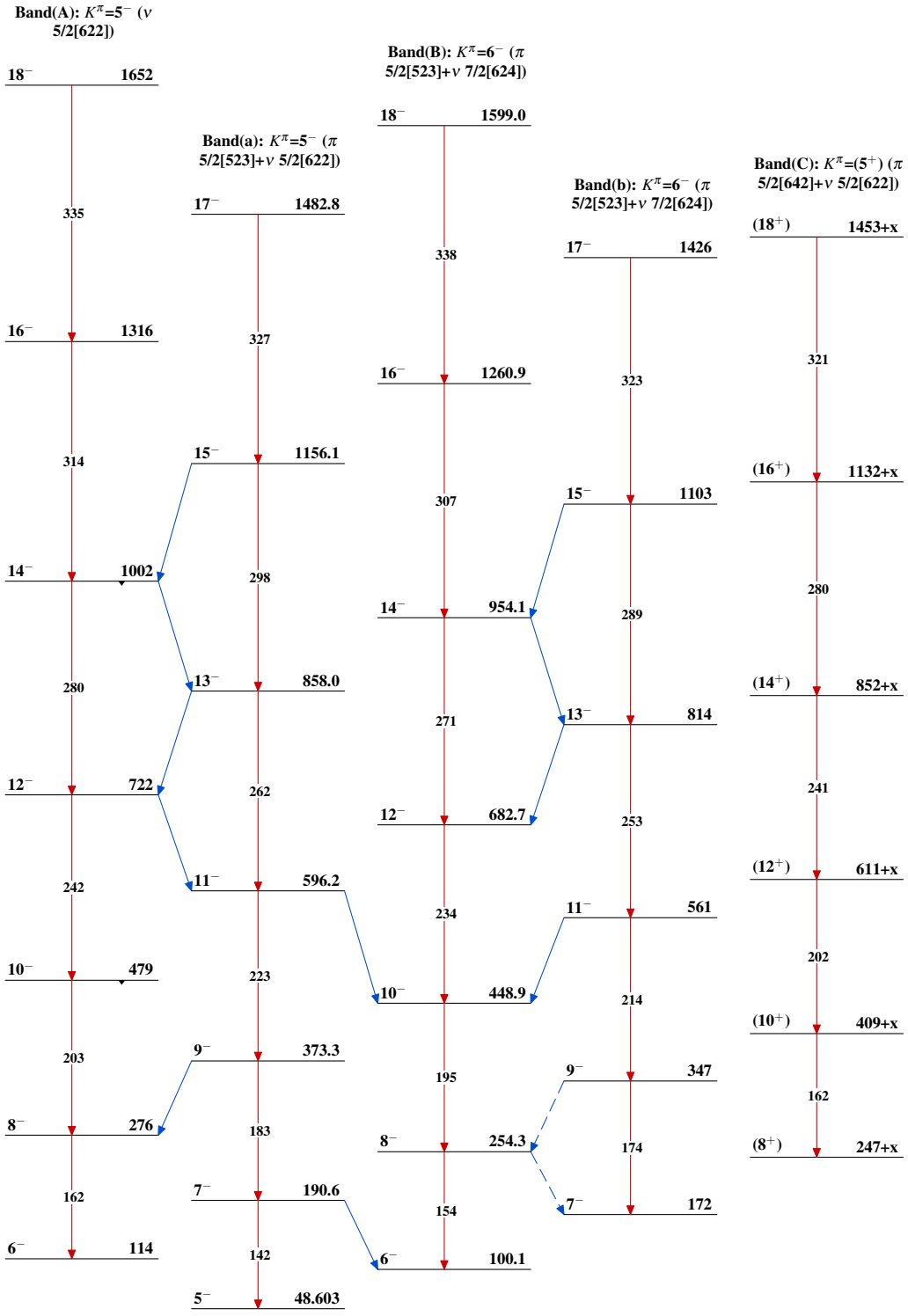
Intensities: Relative I_γ

γ Decay (Uncertain)



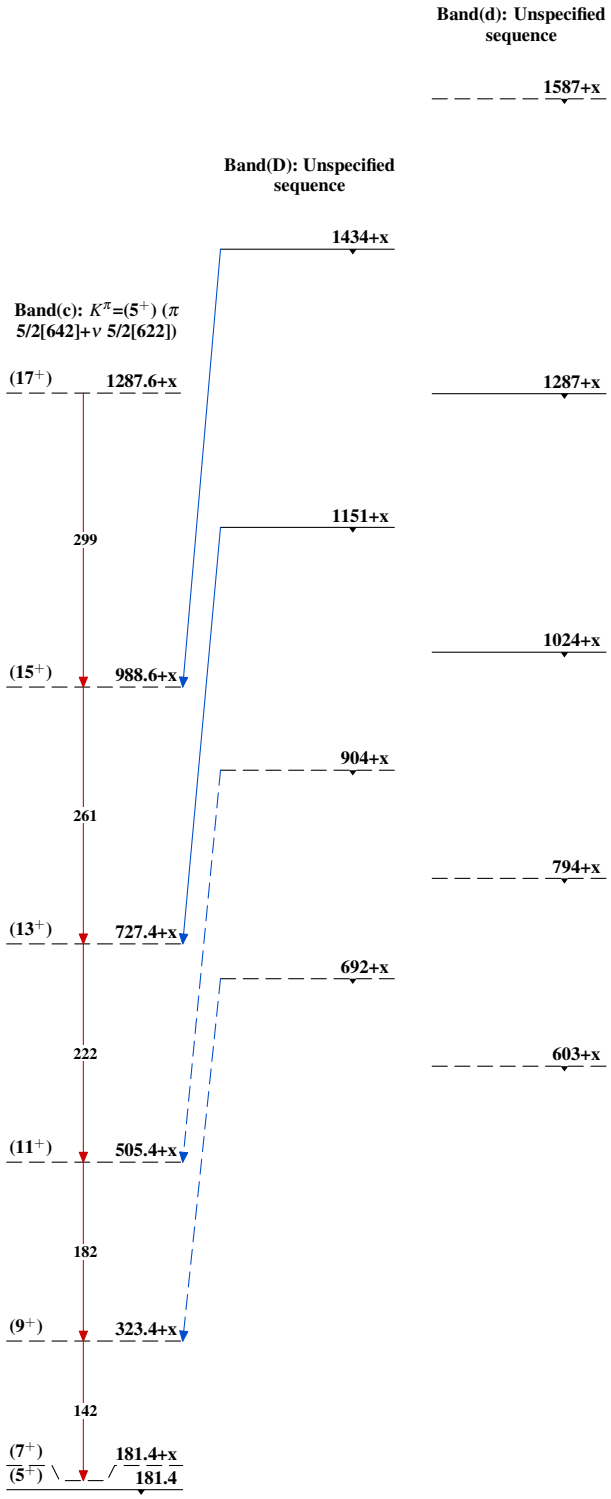
$^{242}_{95}Am_{147}$

Coulomb excitation 2010Ha24



$^{242}_{95}Am_{147}$

Coulomb excitation 2010Ha24 (continued)



$^{242}_{95}Am_{147}$