^{144}Sm(^{42}Ca,p2nγ):E=195,200 MeV 2004Ra28

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 134, 149 (2016)	15-Apr-2015

2004Ra28: E=195, 200 MeV; 95% enriched ^{144}Sm stacked-foil target; JUROSPHERE II array (seven TESSA-type, 5 NORDBALL, 15 EUROGAM Phase I detectors); gas-filled recoil ion separator (RITU) used to separate fusion-evaporation nuclides from unwanted beamlike and fission nuclei; fusion evaporation residues implanted into Si strip detector covering 70% of recoil distribution at the focal plane; measured Eγ, Iγ, γγ coin, α, α-(recoil) coin. Statistics inadequate to unambiguously assign mult from angular correlation data.

^{183}Tl Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$	Comments
628.7[&]	9/2⁻	53.3 ms *3*	%IT=? E(level): level energy fixed At adopted value for least-squares fit. $T_{1/2}$: From exponential fit to time difference between pairs of recoils and α decays, assuming exponential background (2004Ra28). Three α groups observed by 2004Ra28 from the decay of 9/2⁻ isomer with Eα (relative Iα): 6330 *10* (78 *9*); 6384 *16* (16 *4*); 6456 *15* (4 *2*).
905.4[&] *3*	(11/2⁻)		
927.70[@] *25*	(9/2⁻)		
975.3[#] *3*	(13/2⁺)		
1027.70[@] *25*	(13/2⁻)		
1095.7[a] *5*	(11/2⁻)		
1135.1[#] *5*	(17/2⁺)		
1159.7[&] *5*	(13/2⁻)		
1332.7[@] *4*	(17/2⁻)		
1395.1[#] *6*	(21/2⁺)		
1442.4[a] *6*	(15/2⁻)		
1467.2[&] *6*	(15/2⁻)		
1597.3 *6*			
1669.6 *7*			
1713.7[@] *5*	(21/2⁻)		
1749.9[#] *6*	(25/2⁺)		
1855.3[a] *8*	(19/2⁻)		
2168.8[@] *7*	(25/2⁻)		
2188.8[#] *8*	(29/2⁺)		
2268.3 *8*			
2337.1[a] *10*	(23/2⁻)		
2344.9 *8*			
2688.7[@] *9*	(29/2⁻)		
2703.3[#] *9*	(33/2⁺)		
2882.8[a] *11*	(27/2⁻)		
3284.6[#] *11*	(37/2⁺)		
3315.8[@] *10*	(33/2⁻)		
3925.4[#] *12*	(41/2⁺)		
0+x[b]			E(level): level energy held fixed In least-squares fit. Possible γ to 902 level.
257.2+x[b] *3*			
406.5+x[b] *5*			Possible γ to 1156 level.
579.1+x[b] *6*			

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^{144}Sm(^{42}Ca,p2nγ):E=195,200 MeV 2004Ra28 (continued)

^{183}Tl Levels (continued)

E(level)[†]
807.5+x[b] *6*
1035.9+x[b] *7*

[†] From least-squares fit to Eγ assuming adopted E(level)=628.7 for the 9/2[−] isomer.
[‡] Authors′ suggested values.
[#] Band(A): π $i_{13/2}$ yrast band.
[@] Band(B): π $h_{9/2}$ prolate band (?). Band assignment based on systematics, e.g., in ^{185,187}Tl.
[&] Band(C): π $h_{9/2}$ oblate band.
[a] Band(D): π $f_{7/2}$ prolate band (?). Band assignment based on systematics, for example in ^{185,187}Tl.
[b] Band(E): Tentative γ sequence. The ordering of the transitions within this cascade is uncertain, so level energies may differ from those shown here.

γ(^{183}Tl)

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[‡]	Comments
69.2[#] *2*		975.3	(13/2⁺)	905.4	(11/2⁻)	[E1]	0.239	
100.0 *3*	0.4 *2*	1027.70	(13/2⁻)	927.70	(9/2⁻)	[E2]	5.92 *12*	
149.3 *3*	<1	406.5+x		257.2+x				
159.8 *3*	8.4 *8*	1135.1	(17/2⁺)	975.3	(13/2⁺)	[E2]	0.914 *15*	
172.6 *3*	<1	579.1+x		406.5+x				
228.4 *3*	<0.2	807.5+x		579.1+x				
228.4 *3*	<0.2	1035.9+x		807.5+x				
254.3 *3*	5.7 *18*	1159.7	(13/2⁻)	905.4	(11/2⁻)	[M1]	0.617	
257.2 *3*	<1	257.2+x		0+x				
260.0 *3*	100	1395.1	(21/2⁺)	1135.1	(17/2⁺)	[E2]	0.1718	
276.7 *3*	8.4 *8*	905.4	(11/2⁻)	628.7	9/2⁻	[M1]	0.489	E_γ: also reported as 277.0 (table III of 2004Ra28) in delayed spectrum.
299.0 *3*	8.4 *8*	927.70	(9/2⁻)	628.7	9/2⁻	[E2+M1]	0.25 *15*	
305.0 *3*	9.8 *23*	1332.7	(17/2⁻)	1027.70	(13/2⁻)			
307.5 *3*	1.9 *12*	1467.2	(15/2⁻)	1159.7	(13/2⁻)			
346.6 *3*		975.3	(13/2⁺)	628.7	9/2⁻	[M2]	0.923	
346.7 *3*	6.9 *20*	1442.4	(15/2⁻)	1095.7	(11/2⁻)			
354.8 *3*	78 *4*	1749.9	(25/2⁺)	1395.1	(21/2⁺)			
381.0 *3*	8.0 *14*	1713.7	(21/2⁻)	1332.7	(17/2⁻)			
399.0 *3*	4.0 *20*	1027.70	(13/2⁻)	628.7	9/2⁻			
412.9 *5*	3.7 *13*	1855.3	(19/2⁻)	1442.4	(15/2⁻)			
438.9 *5*	21.4 *20*	2188.8	(29/2⁺)	1749.9	(25/2⁺)			
455.1 *5*	5.3 *12*	2168.8	(25/2⁻)	1713.7	(21/2⁻)			
467.0 *5*	8.4 *8*	1095.7	(11/2⁻)	628.7	9/2⁻			
481.8 *5*	2.2 *10*	2337.1	(23/2⁻)	1855.3	(19/2⁻)			
514.5 *5*	7.0 *12*	2703.3	(33/2⁺)	2188.8	(29/2⁺)			
518.4 *5*	<0.2	2268.3		1749.9	(25/2⁺)			
519.9 *5*	<0.2	2688.7	(29/2⁻)	2168.8	(25/2⁻)			
534.5 *5*	5 *3*	1669.6		1135.1	(17/2⁺)			E_γ: from table III of 2004Ra28; 534.6 in authors′ figure 6.
545.7 *5*	1.6 *9*	2882.8	(27/2⁻)	2337.1	(23/2⁻)			
581.3 *5*	<1	3284.6	(37/2⁺)	2703.3	(33/2⁺)			
595.0 *5*	<0.2	2344.9		1749.9	(25/2⁺)			E_γ: from table III of 2004Ra28; 595.4 in authors′ figure 6.
622.0[#] *5*	<1	1597.3		975.3	(13/2⁺)			

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$^{144}Sm(^{42}Ca,p2n\gamma)$:E=195,200 MeV 2004Ra28 (continued)

$\gamma(^{183}Tl)$ (continued)

E_γ[†]	I_γ	E_i(level)	J^π_i	E_f	J^π_f
627.1 *5*	<0.2	3315.8	(33/2⁻)	2688.7	(29/2⁻)
640.8 *5*	<1	3925.4	(41/2⁺)	3284.6	(37/2⁺)

† Based on authors′ estimate of 0.3 keV for low Eγ, rising to 0.5 keV at high energy, the evaluator assigns 0.3 keV if Eγ<400 keV and 0.5 keV otherwise.

‡ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

Placement of transition in the level scheme is uncertain.

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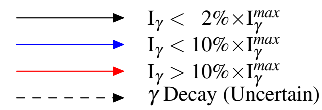
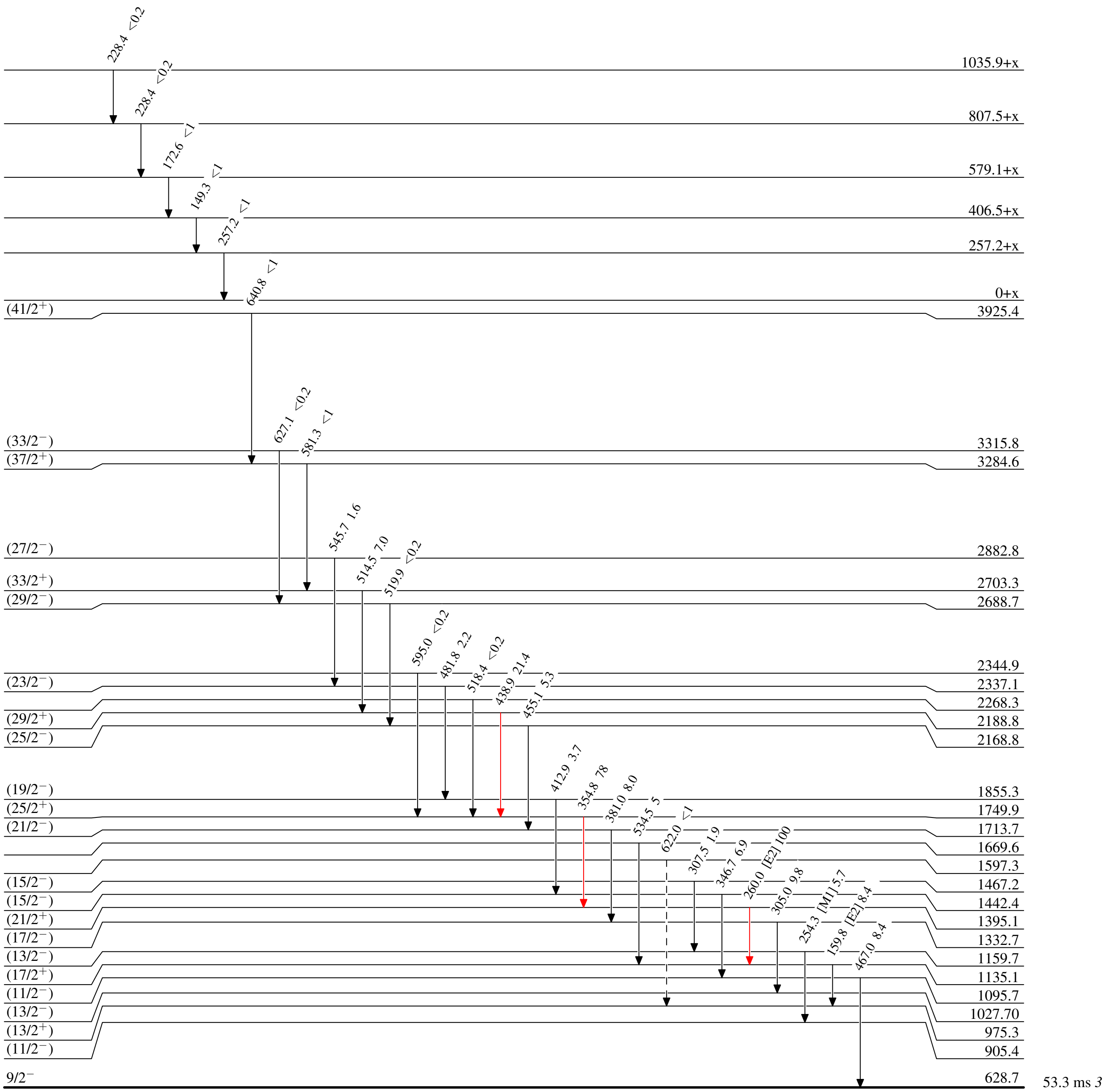
Level Scheme

Intensities: Relative I_γ

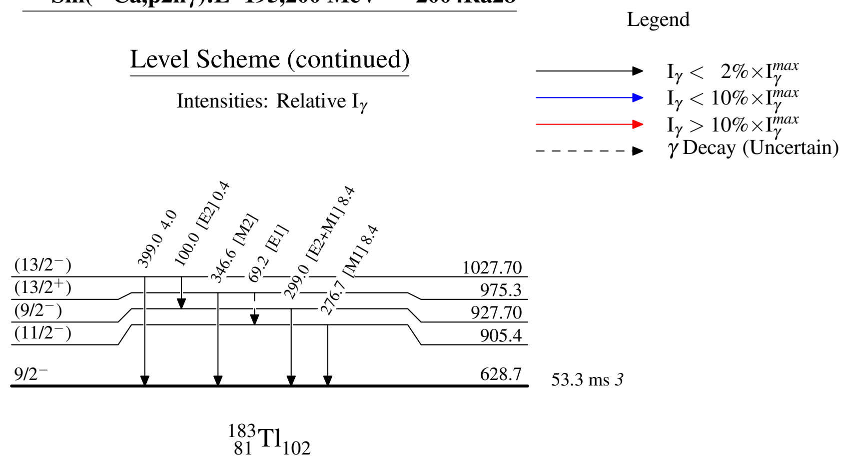
Legend



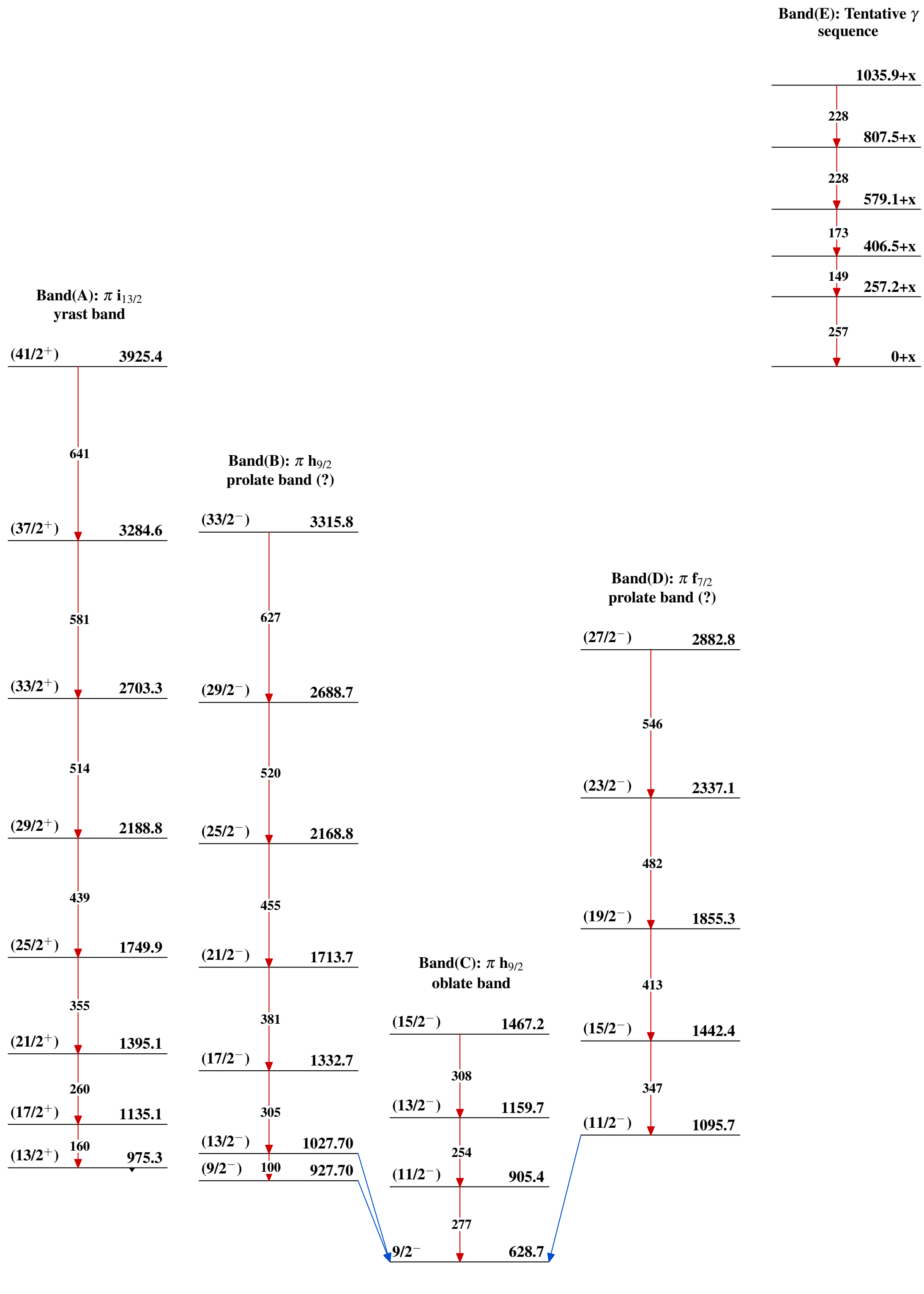


$^{183}_{81}Tl_{102}$

$^{144}Sm(^{42}Ca,p2n\gamma)$:E=195,200 MeV 2004Ra28



$^{144}Sm(^{42}Ca,p2n\gamma)$:E=195,200 MeV 2004Ra28



$^{183}_{81}Tl_{102}$