^{144}Sm(^{14}N,3nγ) 2007Ra21

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 160, 1 (2019)	21-Oct-2019

Data set based on XUNDL file compiled by S. Geraedts and B. Singh (McMaster).

2007Ra21: E=70 MeV beam provided by 15 UD Pelletron at IUAC, New Delhi. Enriched target. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO) using GDA array of 10 Ge detectors with Compton-suppression and 14 BGO detector array used as multiplicity filter. There were four Ge detectors at 50°, and three each at 98° and 144°.

1985Ko30: studied several reactions and nuclei and found the E2 cascade 455.5-597.0-619.8-560 in ^{155}Tm, that was confirmed by 2007Ra21 (with slightly different ordering of transitions).

^{155}Tm Levels

Low-lying states are described by configurations: $\pi h^5_{11/2}\otimes\nu(f^2_{7/2}\ h^2_{9/2})$ or $\pi h^5_{11/2}\otimes\nu(f^4_{7/2})$.

E(level)†	J$^\pi$	E(level)†	J$^\pi$	E(level)†	J$^\pi$	E(level)†	J$^\pi$
0.0‡	11/2$^-$	2570.8 *10*		3321.6 *11*		4875.2 *13*	
535.8‡ *3*	15/2$^-$	2768.6‡ *11*	31/2$^-$	3610.9‡ *11*	35/2$^-$	4994.7‡ *14*	(47/2$^-$)
1132.7‡ *7*	19/2$^-$	2778.7 *10*		3660.0 *12*		5101.5 *13*	
1752.9‡ *9*	23/2$^-$	2908.2 *12*		3771.3 *11*	(35/2$^-$)	5230.3 *14*	
2040.9 *9*	(21/2$^-$)	2915.7 *11*		4086.4 *12*		5440.0 *14*	
2134.7 *10*	(23/2,27/2)$^-$	3032.4 *11*	(31/2$^-$)	4246.6‡ *12*	(39/2$^-$)	6221.8‡ *15*	(51/2$^-$)
2313.2‡ *10*	27/2$^-$	3285.7 *13*		4532.6 *12*			
2378.6 *10*	(23/2$^-$)	3292.8 *12*	35/2$^-$	4648.7‡ *13*	(43/2$^-$)		

† From least-squares fit to Eγ's.

‡ Band(A): $\pi h_{11/2}$.

γ(^{155}Tm)

DCO corresponds to gates on ΔJ=2, quadrupole transitions. Expected values are: 1.0 for ΔJ=2, quadrupole and 0.7 for ΔJ=1, dipole. Angles used are 50° and 98°.

E$_\gamma$	I$_\gamma$†	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	Comments
139.6 *5*	1.2 *2*	2908.2		2768.6	31/2$^-$		
160.5 *5*	4.0 *5*	3771.3	(35/2$^-$)	3610.9	35/2$^-$		
178.5 *5*	13.7 *1*	2313.2	27/2$^-$	2134.7	(23/2,27/2)$^-$	(M1,E2)	DCO=1.01 *6* Mult.: DCO gives ΔJ=0, dipole or ΔJ=2, Q.
287.9 *5*	3.8 *2*	2040.9	(21/2$^-$)	1752.9	23/2$^-$		
337.7 *5*	2.7 *2*	2378.6	(23/2$^-$)	2040.9	(21/2$^-$)	(E2+M1)	DCO=0.75 *22*
346.0 *5*	1.5 *1*	4994.7	(47/2$^-$)	4648.7	(43/2$^-$)		
377.5 *5*	3.0 *2*	3285.7		2908.2			
381.7 *5*	20.8 *1*	2134.7	(23/2,27/2)$^-$	1752.9	23/2$^-$	(M1,E2)	DCO=0.99 *6* Mult.: DCO gives ΔJ=0, dipole or ΔJ=2, Q.
402.1 *5*	5.7 *2*	4648.7	(43/2$^-$)	4246.6	(39/2$^-$)	(E2)	DCO=1.01 *16*
455.5 *5*	36.1 *4*	2768.6	31/2$^-$	2313.2	27/2$^-$		
475.5 *5*	2.3‡ *4*	4086.4		3610.9	35/2$^-$		
524.2 *5*	8.1‡ *5*	3292.8	35/2$^-$	2768.6	31/2$^-$	E2	DCO=1.01 *7*
535.8 *5*	100.0 *1*	535.8	15/2$^-$	0.0	11/2$^-$	E2	DCO=0.98 *4*
560.3 *5*	30.6 *10*	2313.2	27/2$^-$	1752.9	23/2$^-$	E2	DCO=1.00 *5*

Continued on next page (footnotes at end of table)

^{144}Sm(^{14}N,3nγ) 2007Ra21 (continued)

γ(^{155}Tm) (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
564.8 *5*	2.1 *2*	5440.0		4875.2			
581.6 *5*	0.9 *1*	5230.3		4648.7	(43/2$^-$)		
596.9 *5*	85.5[‡] *23*	1132.7	19/2$^-$	535.8	15/2$^-$	E2	DCO=1.07 *4*
620.2 *5*	71.1 *10*	1752.9	23/2$^-$	1132.7	19/2$^-$	E2	DCO=0.99 *4*
628.6 *5*	6.4 *3*	4875.2		4246.6	(39/2$^-$)		
635.7 *5*	14.3 *3*	4246.6	(39/2$^-$)	3610.9	35/2$^-$	(E2)	DCO=0.98 *15*
719.1 *5*	8.6[‡] *2*	3032.4	(31/2$^-$)	2313.2	27/2$^-$	(E2)	DCO=0.99 *21*
738.9 *5*	3.4[‡] *12*	3771.3	(35/2$^-$)	3032.4	(31/2$^-$)	(E2)	DCO=0.9 *3*
744.3 *5*	5.0 *2*	3660.0		2915.7			
750.8 *5*	4.7 *1*	3321.6		2570.8			
761.3 *5*	1.5 *1*	4532.6		3771.3	(35/2$^-$)		
781.0 *5*	6.7 *1*	2915.7		2134.7	(23/2,27/2)$^-$	(E2+M1)	DCO=0.97 *20*
817.9 *5*	3.5 *3*	2570.8		1752.9	23/2$^-$		
842.3 *5*	22.6 *11*	3610.9	35/2$^-$	2768.6	31/2$^-$	E2	DCO=1.03 *7*
908.2 *5*	4.6 *3*	2040.9	(21/2$^-$)	1132.7	19/2$^-$	(E2+M1)	DCO=0.79 *22*
1015.1 *5*	1.0 *1*	5101.5		4086.4			
1025.8 *5*	1.6 *1*	2778.7		1752.9	23/2$^-$		
1227.1 *5*	1.2 *1*	6221.8	(51/2$^-$)	4994.7	(47/2$^-$)		

[†] Uncertainties include those arising from peak fitting and background subtraction. There is additional 5-10% uncertainty from efficiency calibration.

[‡] Intensity obtained from the gated spectra.

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Level Scheme

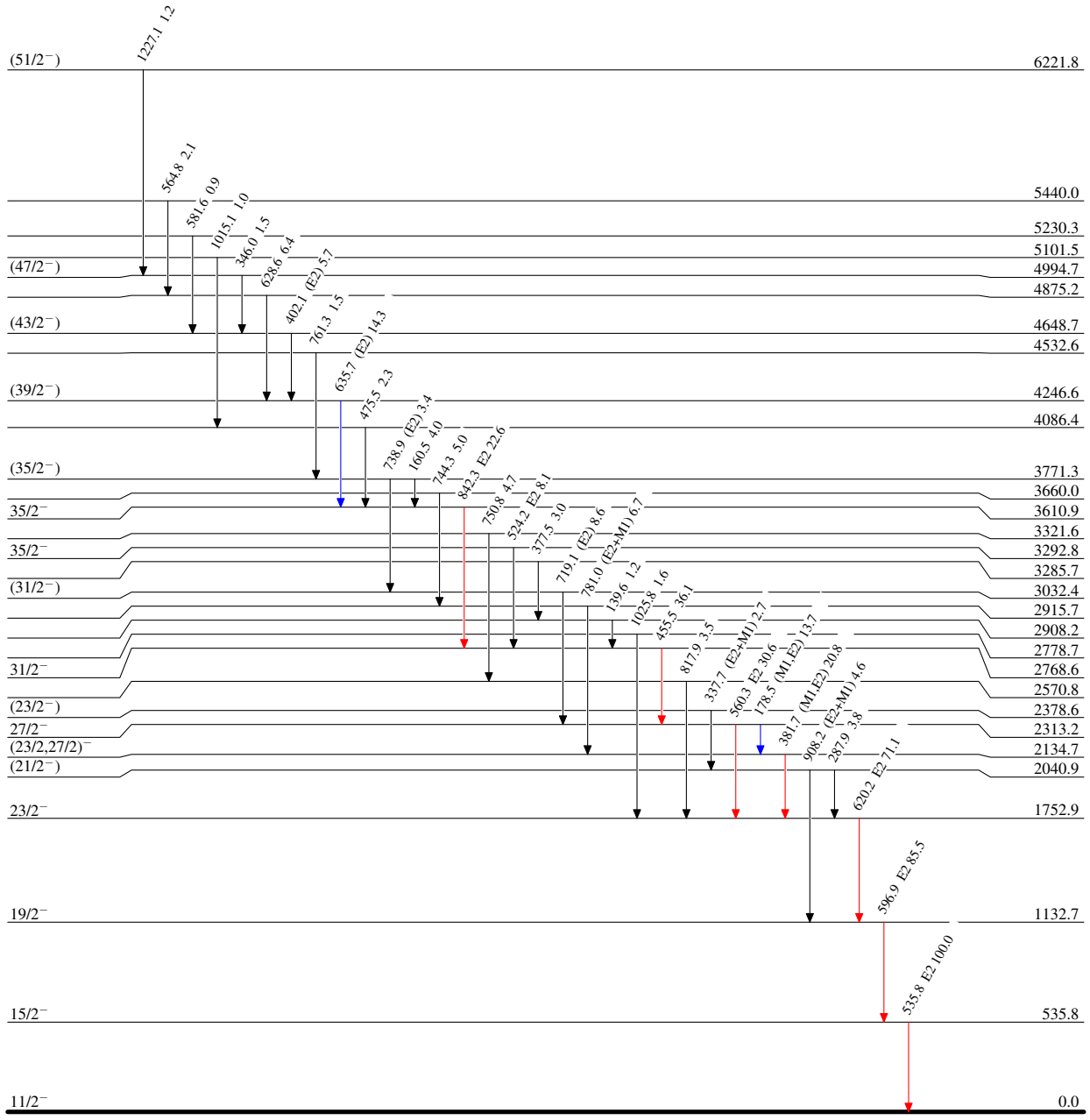
Intensities: Relative I_γ

Legend

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

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

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



$^{155}_{69}Tm_{86}$

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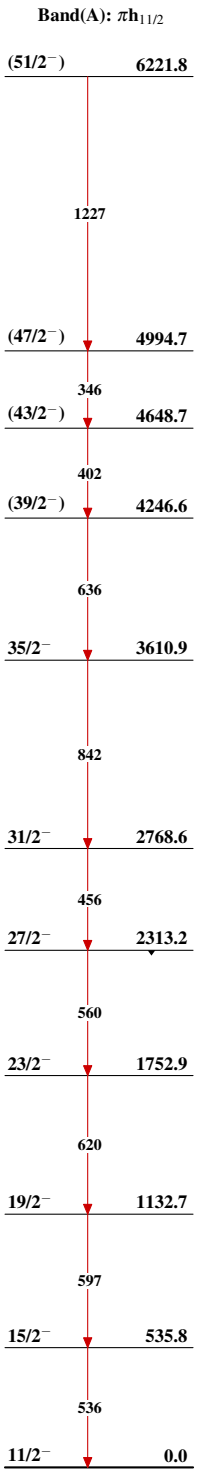

$^{155}_{69}Tm_{86}$