^{154}Sm(α,t)　　**1979Bu03**

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

Additional information 1.

^{154}Sm(α,t): E(α)=25 MeV. Enriched (99.5% ^{154}Sm) metallic targets of thickness ≈20 μg/cm^2. Reaction products were analyzed in an Enge split-pole magnetic spectrograph and detected in photographic emulsions. Peak widths (FWHM)=10 keV. Spectra were measured at θ=45° and 60° only. 1979Bu03 estimate ΔE=2 keV for E<1000 keV and ΔE=3 keV for E>1000 keV.

1970Bu21 also used the (α,t) reaction to study the proton states in ^{155}Eu (as well as in ^{151}Pm and ^{153}Eu).

^{155}Eu Levels

E(level)	J$^{\pi\ddagger}$	S$^{\#@}$	Comments
0.0$^{\&}$	5/2$^+$	2	
79$^{\&}$ 2	7/2$^+$	48	
≈103^a	5/2$^-$	≤1	
169^a 2	7/2$^-$	≈3	
179$^{\&}$ 2	9/2$^+$	≈2.5	
≈246^b	3/2$^+$	≈6	
≈256^a	9/2$^-$	≈4	
308^b 2	5/2$^+$	98	
357^a 2	11/2$^-$	80	
392^b 2	7/2$^+$	3	
≈488^a	13/2$^-$	≈1	
501^b 2	9/2$^+$	≈2	
624$^{\dagger a}$ 4	(15/2$^-$)	1.3	
878† 4		≈4	
910^c 2	3/2$^+$	24	
≈923$^{\dagger d}$	1/2$^+$	≤2	
955^d 2	5/2$^+$	8	
977^e 2	7/2$^+$	40	
≈1004$^{\dagger d}$	3/2$^+$	≈1	
1022 3		3	
1051 3		≈3	
1066^c 3	5/2$^+$	≈7	
≈1112		≈1	
≈1194		≈6	
≈1203		20	
1230^f 3	5/2$^+$	12	This level configuration contains a large component of 5/2[402], but a sizeable component is also located in the 1478 level.
1352 3		12	
1377 3		4	
≈1400		12	
1478 3	5/2$^+$	10	J$^{\pi}$: In addition to strong L=2 transitions observed at 1230 keV and 1478 keV in (α,t) and (^{3}He,d), one of these states is also populated by an L=0 transition in ^{153}Eu(t,p), which requires the 5/2$^+$ assignment. 1979Bu03 suggest that the 5/2[402] stripping strength may be split between these two levels. In the (pol t,α) experiment 1979Bu03 observe negative analyzing powers for a level seen at 1481 keV, leading them to conclude that the 1481 level is not the same level as that observed at 1478 keV in (α,t).
≈1515		≈4	
≈1526		≈3	

Continued on next page (footnotes at end of table)

<u>^{154}Sm(α,t)</u>   **1979Bu03 (continued)**

<u>^{155}Eu Levels (continued)</u>

[†] Value from the (t,α) reaction. Level energy not reported in (α,t).

[‡] From adopted values. The listed assignments were made based in part on a consideration of those deduced from the (t,α) reaction study from a comparison of the measured (pol t,α) cross sections and analyzing powers with DWBA predictions.

[#] Label=dσ/dΩ(μb/sr).

[@] Values at θ=45°.

[&] Band(A): 5/2[413] band.

[a] Band(B): 5/2[532] band.

[b] Band(C): 3/2[411] band.

[c] Band(D): 1/2[411] band.

[d] Band(E): 1/2[420] band.

[e] Band(F): 7/2[404] band.

[f] Band(G): 5/2[402] band.

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Band(D): 1/2[411] band

5/2$^+$ 1066

Band(E): 1/2[420] band

3/2$^+$ ≈1004   **Band(F): 7/2[404] band**

7/2$^+$ 977

5/2$^+$ 955

1/2$^+$ ≈923

3/2$^+$ 910

Band(B): 5/2[532] band

(15/2$^-$)   624

Band(C): 3/2[411] band

9/2$^+$ 501

13/2$^-$ ≈488

7/2$^+$ 392

11/2$^-$ 357

5/2$^+$ 308

9/2$^-$ ≈256   3/2$^+$ ≈246

Band(A): 5/2[413] band

9/2$^+$ 179

7/2$^-$ 169

5/2$^-$ ≈103

7/2$^+$ 79

5/2$^+$ 0.0

$^{155}_{63}$Eu$_{92}$

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Band(G): 5/2[402] band

5/2$^+$ 1230

$^{155}_{63}$Eu$_{92}$

^{154}Sm(α,t)   1979Bu03 (continued)