

$^{150}\text{Sm}(\text{p},2\text{n}\gamma)$ 1977Na27

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen		NDS 185, 2 (2022)	23-Aug-2022

1977Na27: E(p)=18-26 MeV beams from the IMS and the INS SF cyclotrons of the University of Tokyo. Measured E_γ , I_γ , prompt and delayed $\gamma\gamma$, $\gamma(\theta)$, excitation functions. Authors assign multiplicities on the basis of the measured angular distributions; however, they do not quote A_4 values because of the large uncertainties. Therefore, evaluators have treated these assignments as well as the spin assignments as tentative.

1977Na27 suggest that the 994.3-keV $(15/2)^-$ and 1609.3-keV $(19/2)^-$ states are members of a decoupled band based on the 496.3-keV $11/2^-$ state (see also (HI,xn γ) data set).

 ^{149}Eu Levels

E(level) [†]	J^π [‡]	Comments
0.0	$5/2^+$	
149.7 3	$7/2^+$	
459.5 5	$3/2^+, 5/2^+, 7/2^+$	J^π : $(3/2, 5/2)^+$ in the Adopted Levels.
496.2 4	$11/2^-$	
534.4 4	$7/2^+$	
666.2 4	$(7/2^+), 9/2^+$	J^π : from Fig. 9 in 1977Na27 ; $5/2^+, 7/2^+, 9/2^+$ in authors' Table 1. $J^\pi=9/2^+$ in the Adopted Levels.
691.5 7	$5/2^+, 7/2^+$	J^π : $(3/2, 5/2, 7/2)$ in the Adopted Levels.
748.3 5	$7/2^-$	
794.6 7	$9/2^-$	
798.7 4	$(9/2^+)$	
812.7 6	$5/2^+, 7/2^+, 9/2^+$	J^π : $5/2^+$ in the Adopted Levels.
910.4 5	$(9/2^+), 11/2^+$	J^π : $11/2^+$ in the Adopted Levels.
933.1 5	$5/2^+, 7/2^+, 9/2^+$	J^π : $(9/2)^+$ in the Adopted Levels.
938.5 4	$7/2^+, 9/2^+$	J^π : from Fig. 9 in 1977Na27 ; $5/2^+, 7/2^+$ in authors' Table 1. $J^\pi=7/2^+$ in the Adopted Levels.
994.6 6	$15/2^-$	
1096.9 6	$(7/2^-, 9/2^-), 5/2^-$	J^π : $(9/2)^-$ in the Adopted Levels.
1176.5 6	$13/2^-$	
1333.1 5	$(11/2^+), 13/2^+$	J^π : $(13/2^+)$ in the Adopted Levels.
1609.6 8	$19/2^-$	

[†] From least-squares fit to E_γ data, assuming $\Delta E_\gamma=0.5$ keV.

[‡] As given by **1977Na27**, based on $\gamma(\theta)$ data and decay pattern. Exceptions are noted.

 $\gamma(^{149}\text{Eu})$

E_γ	I_γ [†]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
149.8	100	149.7	$7/2^+$	0.0	$5/2^+$		$A_2=-0.08$ 2 M1 in 1977Na27 .
181.5	1.6 4	1176.5	$13/2^-$	994.6	$15/2^-$		
232.0	14.9 6	691.5	$5/2^+, 7/2^+$	459.5	$3/2^+, 5/2^+, 7/2^+$	D	$A_2=-0.21$ 5 M1+E2 in 1977Na27 .
244.6	6.6 [#] 5	910.4	$(9/2^+), 11/2^+$	666.2	$(7/2^+), 9/2^+$		$A_2=+0.06$ 13 M1+E2 in 1977Na27 .
264.5	9.3 6	798.7	$(9/2^+)$	534.4	$7/2^+$	D	$A_2=-0.09$ 12 M1+E2 in 1977Na27 .
298.4	15.5 8	794.6	$9/2^-$	496.2	$11/2^-$		$A_2=-0.35$ 4 M1+E2 in 1977Na27 .
346.5	76.9 25	496.2	$11/2^-$	149.7	$7/2^+$		$A_2=-0.03$ 2 M2 in 1977Na27 .

Continued on next page (footnotes at end of table)

$^{150}\text{Sm}(\text{p}, 2\text{n}\gamma)$ **1977Na27** (continued) $\gamma(^{149}\text{Eu})$ (continued)

E_γ	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	Comments
385.2	2.8 [#] 4	534.4	7/2 ⁺	149.7	7/2 ⁺	D	$A_2 = -0.25$ 19 M1+E2 in 1977Na27 .
423.0	3.1 4	1333.1	(11/2 ⁺), 13/2 ⁺	910.4	(9/2 ⁺), 11/2 ⁺	D	$A_2 = -0.18$ 26 M1+E2 in 1977Na27 .
459.5	13.2 6	459.5	3/2 ⁺ , 5/2 ⁺ , 7/2 ⁺	0.0	5/2 ⁺		$A_2 = +0.01$ 12 E_γ : from Fig. 9 in 1977Na27 ; 495.5 in authors' Table 1 is a misprint.
496.3	6.5 10	496.2	11/2 ⁻	0.0	5/2 ⁺	E3	M1(+E2) in 1977Na27 .
498.0	24.0 35	994.6	15/2 ⁻	496.2	11/2 ⁻	(Q)	Mult.: from the Adopted Gammas. $A_2 = +0.25$ 4 E2 in 1977Na27 .
516.0	32.5 50	666.2	(7/2 ⁺), 9/2 ⁺	149.7	7/2 ⁺		
534.0	32.1 [#] 12	534.4	7/2 ⁺	0.0	5/2 ⁺		$A_2 = +0.05$ 3 M1+E2 in 1977Na27 .
615.0	5.7 6	1609.6	19/2 ⁻	994.6	15/2 ⁻	(Q)	$A_2 = +0.33$ 14 E2 in 1977Na27 .
663.0	5.1 8	812.7	5/2 ⁺ , 7/2 ⁺ , 9/2 ⁺	149.7	7/2 ⁺		
666.5 [@]	9.0 [@] 13	666.2	(7/2 ⁺), 9/2 ⁺	0.0	5/2 ⁺		$A_2 = +0.22$ 15 I_γ : from the Adopted Gammas, most of the intensity must belong with 666 level. However, the authors attribute this γ to 1334 level only. But from the Adopted Gammas, $I_\gamma \approx 3$ with 1334 level. E2 in 1977Na27 .
666.5 [@]	≈ 3 [@]	1333.1	(11/2 ⁺), 13/2 ⁺	666.2	(7/2 ⁺), 9/2 ⁺		I_γ : from the Adopted Gammas.
680.7	9.1 6	1176.5	13/2 ⁻	496.2	11/2 ⁻	D+Q	$A_2 = -0.57$ 11 M1+E2 in 1977Na27 .
748.3	12.8 7	748.3	7/2 ⁻	0.0	5/2 ⁺		$A_2 = +0.01$ 6 E1(+M2) in 1977Na27 .
760.8	11.2 [#] 6	910.4	(9/2 ⁺), 11/2 ⁺	149.7	7/2 ⁺		$A_2 = +0.20$ 7 E2(+M1) in 1977Na27 .
788.8	2.7 [#] 5	938.5	7/2 ⁺ , 9/2 ⁺	149.7	7/2 ⁺		$A_2 = -0.19$ 28 M1(+E2) in 1977Na27 .
798.6	11.3 14	798.7	(9/2 ⁺)	0.0	5/2 ⁺		$A_2 = +0.06$ 14
933.1	16.5 9	933.1	5/2 ⁺ , 7/2 ⁺ , 9/2 ⁺	0.0	5/2 ⁺		
938.5	5.4 [#] 6	938.5	7/2 ⁺ , 9/2 ⁺	0.0	5/2 ⁺		I_γ : $I_\gamma(938\gamma)/I_\gamma(789\gamma) = 2$ disagrees with 0.33 from ^{149}Gd ε decay. From the published γ -ray singles spectrum it seems that the $I_\gamma(789\gamma) = 2.7$ may be a misprint.
947.2	4.9 6	1096.9	(7/2 ⁻ , 9/2 ⁻), 5/2 ⁻	149.7	7/2 ⁺		

[†] At 22 MeV.[‡] From $\gamma(\theta)$, unless otherwise stated. Assignments in Table 1 of **1977Na27** are given in comments.[#] Branching ratio disagrees with that from the Adopted Gammas.[@] Multiply placed with intensity suitably divided.

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Level Scheme

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

Legend

- $I_\gamma < 2\% \times I_\gamma^{\max}$
- $I_\gamma < 10\% \times I_\gamma^{\max}$
- $I_\gamma > 10\% \times I_\gamma^{\max}$
- Coincidence

