

$^{123}\text{Sb}(\text{n},\text{n}'\gamma)$ **1978AhZX,1979Ho28**

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Full Evaluation	Jun Chen	NDS 174, 1 (2021)	15-Apr-2021

1978AhZX: E=0.12-3.4 MeV fast neutron beams were produced from the reactor at the Baghdad Nuclear Research Institute. γ rays were detected with a 30 cm³ Ge(Li) detector. Measured E_γ , I_γ . Deduced levels.

1979Ho28: E=1.5-2.7 MeV neutron beams were produced by $^3\text{H}(\text{p},\text{n})$ with proton beams at the Nuclear Research Centre of the University of Alberta, Canada. γ rays were detected with two Ge(Li) detectors. Measured E_γ , I_γ , $\gamma(\theta)$. Deduced levels, J, γ -ray mixing ratios. Comparisons with theoretical calculations.

1971Ba47: E=0.6-1.9 MeV neutron beams were produced via $^7\text{Li}(\text{p},\text{n})$, $^3\text{H}(\text{p},\text{n})$ with proton beams from the Atomic Energy Board 3-MeV Van de Graaff accelerator, South Africa. Natural target. γ rays were detected with a 40 cm³ Ge(Li) detector. Measured E_γ , I_γ . Deduced levels. Comparisons with available data and theoretical calculations.

Others: **1967NaZX** (E(n)=0.4-2.8 MeV), **1972LaZA** (E(n)=8 and 8.8 MeV), **1979HaZS** (E(n)=3 MeV; measured σ).

The level scheme is that proposed by **1971Ba47** and **1978AhZX**, unless otherwise noted.

 ^{123}Sb Levels

E(level) [†]	J π [‡]	Comments
0.0	7/2 ⁺	
160.34 22	5/2 ⁺	
542.12 18	(3/2) ⁺	
712.4 3	1/2 ⁺	
1030.3 3	9/2 ⁺	J π : spin=9/2 (favored) or 11/2 (0.13% confidence) from $\gamma(\theta)$ in 1979Ho28 .
1088.7 4	11/2 ⁺	J π : (9/2,11/2) from $\gamma(\theta)$ in 1979Ho28 .
1181.5 5	(5/2,7/2)	
1261.3 3	(9/2 ⁺)	
1337.5 3	7/2 ⁺ ,9/2 ⁺	J π : 9/2 from $\gamma(\theta)$ in 1979Ho28 .
1509.7 6	(5/2) ⁺	
1514.6 12	7/2	
1575.5 6	3/2 ⁺ ,5/2 ⁺	
1585.8? 7		

[†] From a least-squares fit to γ -ray energies.

[‡] From Adopted Levels. Assignments and arguments from this study are given in comments, where available.

 $\gamma(^{123}\text{Sb})$

E_γ [†]	I_γ [†]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	δ [‡]	Comments
160.9 10	100 34	160.34	5/2 ⁺	0.0	7/2 ⁺			E_γ : from 1971Ba47 . Other: 160.33 used for calibration in 1978AhZX .
381.79 15	15.3 11	542.12	(3/2) ⁺	160.34	5/2 ⁺			E_γ : weighted average of 381.78 15 (1978AhZX), 381.8 2 (1979Ho28), and 382.1 10 (1971Ba47).
542.1 2	7.2 8	542.12	(3/2) ⁺	0.0	7/2 ⁺			E_γ : others: 542.1 2 (1979Ho28), 542.5 10 (1971Ba47). I_γ : others: I(542.1 γ)/I(381.8 γ)=40/60 (1979Ho28), 42/58 (1971Ba47).
552.1 2	3.9 6	712.4	1/2 ⁺	160.34	5/2 ⁺			E_γ : weighted average of 552.0 3 (1978AhZX), 552.2 2 (1979Ho28), and 552.5 10 (1971Ba47).
1021.2 4	9.4 22	1181.5	(5/2,7/2)	160.34	5/2 ⁺			E_γ : weighted average of 1019.8 8 (1978AhZX), 1021.3 3 (1979Ho28), and 1022.0 10 (1971Ba47).
1030.3 3	28 3	1030.3	9/2 ⁺	0.0	7/2 ⁺	D+Q	-1.6 15	E_γ : weighted average of 1030.1 3

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$^{123}\text{Sb}(\text{n},\text{n}'\gamma)$ **1978AhZX,1979Ho28 (continued)** $\gamma(^{123}\text{Sb})$ (continued)

$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
						(1978AhZX), 1030.5 3 (1979Ho28), and 1030.4 10 (1971Ba47). δ : from -3.1 to -0.16 for $J=9/2$ (1979Ho28). E_γ : weighted average of 1088.8 4 (1979Ho28) and 1088.4 10 (1971Ba47). Other: 1088.64 used for calibration in 1978AhZX. δ : 0.32 to 6.3 if $J=9/2$ (1979Ho28). E_γ : weighted average of 1101.1 3 (1978AhZX), 1100.2 6 (1979Ho28), 1102.0 10 (1971Ba47). I_γ : from $I_\gamma=16.4$ 22 including γ ray from ^{121}Sb . E_γ : weighted average of 1176.5 5 (1979Ho28) and 1178.0 10 (1971Ba47). Other: 1179.0 (composite peak, 1978AhZX). I_γ : from 3.3 8 for a composite peak in 1978AhZX. Others: $I(1176.8\gamma)/I(1337.5\gamma)=21/79$ (1979Ho28), 27/72 (1971Ba47). E_γ : other: 1262.0 20 (1971Ba47). E_γ : weighted average of 1337.5 3 (1978AhZX), 1337.8 5 (1979Ho28), and 1338.0 20 (1971Ba47). δ : >28 or <0.18 if $J=9/2$ (1979Ho28). E_γ : from 1971Ba47. Others: 1352.4 (composite peak, 1978AhZX); in Fig 1 of 1979Ho28 a composite peak is seen around this energy but not reported by the authors. I_γ : from 4.2 8 for a composite peak (1978AhZX). Other: $I(1350.0\gamma)/I(1509.6\gamma)=34/66$ (1971Ba47). E_γ, I_γ : energy and placement from 1979Ho28, intensity from 1978AhZX for the 1425.8 8 assigned to ^{121}Sb by 1978AhZX. E_γ : others: 1510.6 20 (1971Ba47); a composite peak of 1509+1515+1519 is shown in Fig 1 of 1979Ho28, but 1509 γ is assigned to ^{121}Sb by the authors. E_γ : from 1979Ho28, for a composite peak of 1509+1515+1519 shown in Fig 1. E_γ : others: 1575.4 7 (1979Ho28), 1576.7 20 (1971Ba47).
1088.7 4	20.0 14	1088.7	11/2 ⁺	0.0	7/2 ⁺	
1101.0 3	<18.6	1261.3	(9/2 ⁺)	160.34	5/2 ⁺	
1176.8 6	<4.1	1337.5	7/2 ⁺ , 9/2 ⁺	160.34	5/2 ⁺	
1261.0 5	3.9 6	1261.3	(9/2 ⁺)	0.0	7/2 ⁺	
1337.6 3	9.2 8	1337.5	7/2 ⁺ , 9/2 ⁺	0.0	7/2 ⁺	
1350.0 20	<5.0	1509.7	(5/2 ⁺)	160.34	5/2 ⁺	
1425.5 [#] 6	3.1 6	1585.8?		160.34	5/2 ⁺	
1509.6 6	4.2 8	1509.7	(5/2 ⁺)	0.0	7/2 ⁺	
1514.6 12		1514.6	7/2	0.0	7/2 ⁺	
1575.5 6	3.1 6	1575.5	3/2 ⁺ , 5/2 ⁺	0.0	7/2 ⁺	

[†] From 1978AhZX, unless otherwise noted. Intensities have been re-normalized to $I(160.33\gamma)=100$ 34, from its original value of 360 120 in 1978AhZX normalized to $I_\gamma=100$ for 909.77 γ in ^{121}Sb . $E_\gamma=160.33$, 1088.64 in ^{123}Sb together with $E_\gamma=573.08$ from ^{121}Sb were used for energy calibration of the γ spectrum by 1978AhZX.

[‡] From $\gamma(\theta)$ (1979Ho28).

[#] Placement of transition in the level scheme is uncertain.

