

$^{28}\text{Si}(^3\text{He},\alpha)$  2009De33,1986Sc21,1971Ba27

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia		NDS 112, 1875 (2011)	30-Nov-2010

Others: 1959Hi68, 1967Da13, 1967Le15, 1971Ma49, 1972Ba06.

**2009De33:**  $^{28}\text{Si}(^3\text{He},\alpha)$  E=17.5 MeV; Enge split-pole spectrograph, position-sensitive ionization drift chamber backed, plastic scintillator;  $\alpha$  particles momentum analyzed; FWHM=80 keV; deduced levels, resonance energies; protons from excited states of  $^{27}\text{Si}$  measured using the Yale lamp-shade array consisting of five 16-strip silicon detectors; also measured proton- $\alpha$  coincidences and proton- $\alpha$  angular correlations; deduced  $\Gamma_p/\Gamma$ .

**1986Sc21:**  $^{28}\text{Si}(^3\text{He},\alpha)$  E=15 MeV; measured  $\sigma(E\alpha)$ ,  $\sigma(q)$ ; Natural targets, magnetic spectrograph, position sensitive detectors, photographic plates; deduced level energies.

**1971Ba27:** Target: 99.4% enriched  $^{28}\text{SiO}$ , projectile energy E=11 MeV; 65 cm Buechner board range spectrograph; exposures made at 30°, 43°, and 64.5° at laboratory angles; deduced level energies of 3539(8), 3805(7), 4139(7), 4300(7), 4459(7), 4487(7), and 4716(7) keV, last four level energies are about 10 keV higher compared to the level energies presented in this dataset.

**1959Hi68:**  $^{28}\text{Si}(^3\text{He},\alpha)$  E=5.8 MeV; magnetic spectrograph, exposures of silica targets taken at ten angles ranging from 7.5° to 60° and at angles 15°, 30°, and 60°; deduced  $^{27}\text{Si}$  level energies.

 $^{27}\text{Si}$  Levels

E(level) <sup>†</sup>	$T_{1/2}^a$	E(level) <sup>†</sup>
0		6572 3
782 <sup>‡</sup> 10	>8.3 ps	6587 6
958 <sup>‡</sup> 10	1.5 ps 3	6626 3
2165 <sup>‡</sup> 10	39 fs 8	6715 3
2651 <sup>‡</sup> 10	11 fs 6	6743 3
2866 <sup>‡</sup> 10	<7 fs	6780 4
2908 <sup>‡</sup> 10	55 fs 8	7005 8
3539 <sup>#</sup> 8		7059 5
3805 <sup>#</sup> 7		7080 3
4139 5		7134 5
4288 5		7223 4
4449 5		7239 4
4477 5		7260 4
4706 5		7276 3
5061 5		7324 4
5227 5		7341 4
5284 5		7388 5
5317 5		7436 4
5402 5		7465 5
5505 5		7530 5
5547 4		7563? <sup>&amp;</sup>
5580 4		7596 4
5613 4		7654 5
5783 6		7703 3
5897 3		7742 3
6028 4		7766? <sup>&amp;</sup>
6059 4		7796 4
6089? <sup>&amp;</sup>		7837 4
6323 4		7870? <sup>&amp;</sup>
6346 4		7909 4
6398? <sup>&amp;</sup>		7974 5
6457 3		8034 5
6513 4		8077 5

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$^{28}\text{Si}(\alpha, \text{He})$  **2009De33,1986Sc21,1971Ba27** (continued) $^{27}\text{Si}$  Levels (continued)

<u>E(level)<sup>†</sup></u>	<u>L<sup>b</sup></u>	<u>Comments</u>
8136 <sup>@</sup> 4	0	$\Gamma_p/\Gamma \geq 4\%$ 1 to 228 keV isomer of $^{26}\text{Al}$ . E(p)(c.m.)=445 keV.
8155 4	0	E(level): Weighted average of 8156 5 (2009De33) and 8154 5 (1986Sc21). E(p)(c.m.)=693 keV. $\Gamma_p/\Gamma = 22\%$ 4 to g.s. of $^{26}\text{Al}$ .
8174 4		
8210 5	0	E(p)(c.m.)=747 keV. $\Gamma_p/\Gamma = 15\%$ 4 to g.s. of $^{26}\text{Al}$ .
8236 5		
8310 4	0	E(level): Weighted average of 8312 4 (2009De33) and 8304 7 (1986Sc21). E(p)(c.m.)=627 keV. $\Gamma_p/\Gamma = 53\%$ 10 to 228 keV isomer of $^{26}\text{Al}$ .
8350 <sup>@</sup> 4	0	E(p)(c.m.)=891 and 474 keV. L: for both proton groups. $\Gamma_p/\Gamma = 39\%$ 6 to g.s. of $^{26}\text{Al}$ . $\Gamma_p/\Gamma = 28\%$ 4 to 417-keV state of $^{26}\text{Al}$ .
8368 3		E(level): Weighted average of 8369 4 (2009De33) and 8367 5 (1986Sc21). E(p)(c.m.)=684 keV.
8440 5		$\Gamma_p/\Gamma = 31\%$ 8 to 228 keV isomer of $^{26}\text{Al}$ . E(p)(c.m.)=755 keV.
8476 5	0	$\Gamma_p/\Gamma = 47\%$ 7 to 228 keV isomer of $^{26}\text{Al}$ . E(p)(c.m.)=606 keV.
8521 5	0	$\Gamma_p/\Gamma = 22\%$ 5 to 417-keV state of $^{26}\text{Al}$ . E(p)(c.m.)=1060 keV.
8556 5	0	$\Gamma_p/\Gamma = 39\%$ 12 to g.s. of $^{26}\text{Al}$ . E(p)(c.m.)=1094, 677 keV. L: for proton decay to 417-keV state. $\Gamma_p/\Gamma = 36\%$ 20 to g.s. of $^{26}\text{Al}$ .
8582 5	0	$\Gamma_p/\Gamma = 35\%$ 17 to 417-keV state of $^{26}\text{Al}$ . E(p)(c.m.)=895 keV.
8660 5	0	$\Gamma_p/\Gamma = 40\%$ 9 to 228 keV isomer of $^{26}\text{Al}$ . E(p)(c.m.)=1205, 788 keV. L: for both proton groups. $\Gamma_p/\Gamma = 16\%$ 5 to g.s. of $^{26}\text{Al}$ .
8777 5	0	$\Gamma_p/\Gamma = 48\%$ 13 to 417-keV state of $^{26}\text{Al}$ . E(p)(c.m.)=1086 keV.
8822 5	0	$\Gamma_p/\Gamma = 60\%$ 26 to 228 keV isomer of $^{26}\text{Al}$ . E(p)(c.m.)=1359 keV.
8867 5	0	$\Gamma_p/\Gamma = 72\%$ 39 to g.s. of $^{26}\text{Al}$ . E(p)(c.m.)=984 keV.
8872 5	0	$\Gamma_p/\Gamma = 94\%$ 13 to 417-keV state of $^{26}\text{Al}$ . E(p)(c.m.)=1181 keV.
8926 5	0	$\Gamma_p/\Gamma = 58\%$ 11 to 228 keV isomer of $^{26}\text{Al}$ . E(p)(c.m.)=1468 keV.
8974 5	0	$\Gamma_p/\Gamma = 0$ to 100% to g.s. of $^{26}\text{Al}$ , unknown background produces an uncertain result. E(p)(c.m.)=1293 keV. $\Gamma_p/\Gamma = 28\%$ 10 to 228 keV isomer of $^{26}\text{Al}$ .
9021 5		
9066 5		
9081 5		
9138 12		
9164 12		
9215 4		
9236 2		

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$^{28}\text{Si}(\alpha, \alpha)$  [2009De33](#), [1986Sc21](#), [1971Ba27](#) (continued) $^{27}\text{Si}$  Levels (continued)

<u>E(level)<sup>†</sup></u>	<u>E(level)<sup>†</sup></u>	<u>E(level)<sup>†</sup></u>	<u>E(level)<sup>†</sup></u>
9256 4	9363 4	9575 2	9767 2
9273 2	9428 3	9615 7	9791 2
9291 8	9438 18	9652 5	9895 2
9345 9	9547 4	9714 3	9918 2

<sup>†</sup> Level energies from 4139-keV to 8236-keV are from [1986Sc21](#), except otherwise noted. Level energies higher than 8440 are from [2009De33](#).

<sup>‡</sup> From [1959Hi68](#).

<sup>#</sup> From [1971Ba27](#).

<sup>@</sup> From [2009De33](#).

<sup>&</sup> Uncertain level not adopted.

<sup>a</sup> From Doppler Shift Attenuation measurements ([1971Ma49](#)).

<sup>b</sup> Minimum L-transfer deduced from angular correlation data ([2009De33](#)).