^{28}Si(α,d),(^{3}He,p) 1976De24,1974Ha38,1982De29

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia, A. Chakraborty	NDS 197,1 (2024)	31-May-2024

Also includes ^{28}Si(^{3}He,p).

1976De24: ^{28}Si(α,d),^{28}Si(^{3}He,p): Natural Si target, Projectile: α and ^{3}He, E=40 MeV and 24.5 MeV, respectively; ΔE-E particle telescope followed by another particle detector; measured deuteron and proton spectra; deduced excited level energy, L value, J^π, differential σ; performed DWBA analysis.

1974Ha38: ^{28}Si(^{3}He,p): 99.9% enriched SiO_2 target; projectile ^{3}He, E=16 and 28 MeV; The protons were detected using emulsion plates and in a multigap spectrograph for the 16 and 28 MeV data, respectively; energy resolution 35 to 40 MeV (FWHM); deduced excited level energies, L values and σ; DWBA analysis.

1982De29: ^{28}Si(α,d), E=50 MeV; natural target, measured $\sigma(\theta)$; deduced levels, spin, parity. DWBA calculations.

1970Gr19: ^{28}Si(^{3}He,p), natural target, projectile E=4.3-11.0 MeV; 14 silicon solid state detectors; proton spectra were measured between 10° to 170°; deduced g.s. and four lowest excited states in ^{30}P, L values.

Others: 1966Ri04 (^{28}Si(α,dγ)), 1970Gr19 (^{28}Si(^{3}He,p)), 1971Be19(^{28}Si(^{3}He,p)), 1979Ve04 (^{28}Si(α,dγ)), 1982Qa02 (^{28}Si(α,d),^{28}Si(^{3}He,p)), 1988Kr11 (^{28}Si(^{12}C,^{10}B)).

^{30}P Levels

E(level)[†]	J$^\pi$[#]	L[&]	Comments
0	1$^+$	2	L: other: (0+2) (^{3}He,p) (1974Ha38). σ_{int}(16 MeV)=383 μb and σ_{int}(28 MeV)=201 μb (1974Ha38); σ(20°)=32 μb/sr ((α,d) work of 1976De24).
677.01 *3*	0$^+$		
708.70 *3*	1$^+$	0	L: other: (0+2) (^{3}He,p) (1974Ha38). σ_{int}(16 MeV)=668 μb and σ_{int}(28 MeV)=539 μb (1974Ha38); σ(20°)=14 μb/sr ((α,d) work of 1976De24).
1454.23 *2*	2$^+$	2	L: other: (2) (^{3}He,p) (1974Ha38). σ_{int}(16 MeV)=117 μb and σ_{int}(28 MeV)=85 μb (1974Ha38); σ(20°)=13 μb/sr ((α,d) work of 1976De24).
1973.27 *4*	3$^+$	4	L: other: (2+4) (^{3}He,p) (1974Ha38). σ_{int}(16 MeV)=306 μb and σ_{int}(28 MeV)=294 μb (1974Ha38); σ(20°)=60 μb/sr ((α,d) work of 1976De24).
2538.95 *5*	3$^+$	2	L: other: (2+4) (^{3}He,p) (1974Ha38). σ_{int}(16 MeV)=204 μb and σ_{int}(28 MeV)=232 μb (1974Ha38); σ(20°)=35 μb/sr ((α,d) work of 1976De24).
2723.72 *7*	2$^+$	(2)[a]	σ_{int}(16 MeV)=97 μb and σ_{int}(28 MeV)=89 μb (1974Ha38).
2839.34 *4*	3$^+$	2	L: other: (0+2,2+4) (^{3}He,p) (1974Ha38). σ_{int}(16 MeV)=143 μb and σ_{int}(28 MeV)=137 μb (1974Ha38); σ(20°)=30 μb/sr ((α,d) work of 1976De24).
2937.46 *2*	2$^+$	(2)[a]	σ_{int}(16 MeV)=303 μb and σ_{int}(18 MeV)=298 μb (1974Ha38); σ(20°)?200 ((α,d) work of 1976De24).
3019.2 *1*	1$^+$	(0+2)[a]	σ_{int}(16 MeV)=459 μb and σ_{int}(28 MeV)=281 μb (1974Ha38).
3733.80 *7*	1$^+$	(2)[a]	σ_{int}(16 MeV)=84 μb and σ_{int}(28 MeV)=43 μb (1974Ha38). S: (0+2) from the (^{3}He,p) work of 1974Ha38 carried out at 28 MeV.
3835.80 *5*	2$^+$	(1)[a]	σ_{int}(16 MeV)=92 μb and σ_{int}(28 MeV)=62 μb (1974Ha38). S: (1+3) from the (^{3}He,p) work of 1974Ha38 carried out at 28 MeV.
3928.61 *5*	3$^+$	(2)[a]	σ_{int}(16 MeV)=231 μb and σ_{int}(28 MeV)=130 μb (1974Ha38).
4143.63 *6*	2$^-$	3	σ(20°)=55 μb/sr (1976De24).
4182.81 *6*	2$^+$	(1+3)[a]	σ_{int}(16 MeV)=2446 μb and σ_{int}(28 MeV)=941 μb (1974Ha38).
4231.97 *9*	4$^-$	3	L: other: (3) (^{3}He,p) (1974Ha38). σ_{int}(16 MeV)=533 μb and σ_{int}(28 MeV)=610 μb (1974Ha38); σ(20°)=100 μb/sr ((α,d) work of 1976De24). S: (1+3) from the (^{3}He,p) work of 1974Ha38 carried out at 28 MeV.

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^{28}Si(α,d),(^{3}He,p) 1976De24,1974Ha38,1982De29 (continued)

^{30}P Levels (continued)

E(level)[†]	Jπ[#]	L[&]	S	Comments
4298.6 *2*	4+	(4)[a]		σ_{int}(16 MeV)=129 μb and σ_{int}(28 MeV)=136 μb (1974Ha38). S: (2+4) from the (^{3}He,p) work of 1974Ha38 carried out at 28 MeV.
4343.8 *1*	5+	3,2		L: other: (2+4) (^{3}He,p) (1974Ha38). σ_{int}(16 MeV)=202 μb and σ_{int}(18 MeV)=114 μb (1974Ha38); σ(20°)=15 μb/sr ((α,d) work of 1976De24).
4422.8 *1*	2+	(2)[a]		σ_{int}(16 MeV)=94 μb and σ_{int}(28 MeV)=67 μb (1974Ha38).
4468.33 *7*	0+			
4502.21 *9*	1+			σ_{int}(16 MeV)=132 μb and σ_{int}(28 MeV)=71 μb (1974Ha38).
4625.92 *8*	3−		(1+3)	σ_{int}(16 MeV)=527 μb and σ_{int}(28 MeV)=191 μb (1974Ha38). S: (3) from the (^{3}He,p) work of 1974Ha38 carried out at 28 MeV.
4736.03 *8*	3+	(3)[a]		σ_{int}(16 MeV)=107 μb and σ_{int}(28 MeV)=104 μb (1974Ha38). S: (1+3) from the (^{3}He,p) work of 1974Ha38 carried out at 28 MeV.
4926.0 *2*	3−			E(level): 4921 keV J=1,2 in 1968Ve04. σ(20°)=50 μb/sr ((α,d) work of 1976De24) for doublet (4926 and 4937).
4944.6 *6*	(1+)	(0+2)[a]		σ_{int}(16 MeV)=250 μb and σ_{int}(28 MeV)=211 μb (1974Ha38).
5027 *4*	(4−)	(2+4)[a]		σ_{int}(16 MeV)=126 μb and σ_{int}(28 MeV)=95 μb (1974Ha38).
5206.8 *1*	3+			σ_{int}(16 MeV)=291 μb (1974Ha38).
5230.1 *3*				σ_{int}(16 MeV)=49 μb and σ_{int}(28 MeV)=133 μb (1974Ha38).
5410 *15*			(0+2)	σ_{int}(16 MeV)=548 μb and σ_{int}(28 MeV)=272 μb (1974Ha38).
5496 *15*			(0+2)	S: from the (^{3}He,p) work of 1974Ha38 carried out at 28 MeV. σ_{int}(16 MeV)=167 μb and σ_{int}(28 MeV)=116 μb (1974Ha38).
5594 *15*				
5704 *15*				
5807 *15*				
5883 *15*				
5997[‡] *15*				
6089 *15*				
6230 *15*				
6294 *15*				
6476 *15*		(3,4)		σ(20°)≈30 μb/sr ((α,d) work of 1976De24).
6661 *15*				
6775 *15*				
6865[‡] *15*				
6916 *15*				
7040 *15*				
7180 *15*				
7200	7+			E(level),Jπ: from 1982De29. Spin and parity are proposed based on comparison of dσ/dΩ and the microscopic FPSDI calculations. Other: 7231 *50* and L=(6) in 1976De24. σ(20°)=250 μb/sr ((α,d) work of 1976De24).
7289 *15*				
7339 *15*		(6)		E(level): other: 7392 *50* in 1976De24; σ(20°)=110 μb/sr ((α,d) 1976De24).
7628[‡@] *50*				
7972[‡@] *50*				
8092[‡@] *50*				
8610[‡@] *50*				

[†] Up to 5230 keV from Adopted Levels, above level energies are from 1974Ha38, except otherwise noted.
[‡] Overlap three or more levels in the adopted dataset, not referenced in 'XREF'.
[#] From the adopted data set.
[@] From 1976De24.

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^{28}Si(α,d),(^{3}He,p) 1976De24,1974Ha38,1982De29 (continued)

^{30}P Levels (continued)

& From (α,d) in 1976De24, except where otherwise noted. L values from (^{3}He,p) in 1974Ha38 are listed in the comments.
[a] From (^{3}He,p) (1974Ha38).