

$^{28}\text{Si}(^3\text{He},\text{n}),(^{12}\text{C},^{10}\text{Be})$ 1982Yo02,1967Mc03,1988Kr11

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

Others: 1965Mc06 (previous article of 1967Mc03), 1967Mi02, 1972Bb01, 1972Gr39, 1974Ab03, 1975Ko03, 1982Bo14, 2010Ta17, 2012Ai23.

1982Yo02: $^3\text{He}(^{28}\text{Si},\text{n})^{30}\text{S}$, E=9.5 MeV; NE213 and two Si surface barrier detectors; n-p coincidence, deduced ^{30}S level energy and possible J^π values of 15 levels in the 5.1 to 7.5 MeV range from proton feeding the ^{29}P g.s. or first excited state.

1988Kr11: $^{28}\text{Si}(^{12}\text{C},^{10}\text{Be})$, E=480 MeV; two (x,y) position sensitive drift chambers, an ionization chamber, two plastic scintillators; measured $\sigma(E,\theta)$; deduced levels, spin and parity. FWHM=200 keV.

2012Ai23: ($^3\text{He},\text{n}$): ^3He beam, E=15 MeV; target: 90 $\mu\text{g}/\text{cm}^2$ ^{28}Si . Measured neutron spectra, tof. Deduced levels, proton decay branching ratios, widths. Also studied through the $^{32}\text{S}(\text{p},\text{t})$ reaction.

 ^{30}S Levels

E(level) [†]	J^π ^{†&}	$T_{1/2}$	L ^a	Comments
0	0 ⁺	1.1798 s 6	0	$T_{1/2}$: from the Adopted Levels. $d\sigma(n_0)$ =2.0 mb/sr 4 at 5°, for E=5.6 MeV (1967Mc03), $d\sigma(n_0)$ =3.7 mb/sr 11 at 0° for E=11.60 MeV (1967Mi02). Relative population magnitude, R_{exp} =1.00 (1972Gr39). Configuration: $\nu(s_{1/2})^{+2}$ (1972Gr39).
2211 25	2 ⁺		2	E(level): weighted average of 2210 30 (1967Mc03 – previous value 2113 15 in 1965Mc06), 2190 40 (1967Mi02), and 2220 25 (1972Gr39). Other: 2200 210 (2012Ai23). $d\sigma(n_0)$ =1.0 mb/sr 2 at 5° for E=5.6 MeV (1967Mc03), $d\sigma(n_0)$ =0.7 mb/sr 3 at 0° for E=11.60 MeV (1967Mi02 from ratio of 0.19 5 with g.s. cross section). relative population magnitude, R_{exp} =0.50-0.90 (1972Gr39). Configuration: $\nu(s_{1/2})^{+1}(d_{3/2})^{+1}$ (1972Gr39); $\nu(s_{1/2})^{+2}$ (1974Ab03).
3420 30	2 ⁺		2	E(level): weighted average of 3430 30 (1967Mc03 – previous value 3291 15 1965Mc06), 3410 30 (1972Gr39 – $J^\pi=(0^+),(2^+)$). Other: 3600 260 – doublet (2012Ai23). Relative population magnitude, R_{exp} =0.15-0.30 (1972Gr39). Configuration: $\nu(d_{3/2})^{+2}$ (1972Gr39). $d\sigma(n_0)$ =0.5 mb/sr 2 at 5° (1967Mc03).
3700 30				E(level): weighted average of 3690 30 (1972Gr39) and 3710 30 (1967Mc03). $J^\pi=(2^+),(0^+)$ in 1972Gr39. Configuration: $\nu(d_{3/2})^{+2}$ (1972Gr39). Relative population magnitude, R_{exp} =0.20-0.35 (1972Gr39). $d\sigma(n_0)$ =1.00 mb/sr +5–3 at 5° (1967Mc03).
5200@ 44	0 ⁺ @			%p(to g.s. of ^{29}P)=100 2 (2012Ai23).
5288 [‡]	3 ⁻ [‡]		3	E(level): other: 5210 50 (1972Gr39). The level was also populated, not strongly, in $(^{12}\text{C},^{10}\text{Be})$ (1988Kr11) – consistent with a natural parity configuration. J^π : $J^\pi=3^-$, based on analogue state of ^{30}Si at 5487 keV (1988Kr11). L: from 1982Yo02. Relative population magnitude, R_{exp} =1.2-1.9 (1972Gr39). Configuration: $\nu(f_{7/2})^{+1}(s_{1/2})^{+1}$ (1972Gr39 – $J^\pi=(3^-)$).
5400@ 43	2 ⁺ @			E(level), J^π : Other: 5425 and J=(1,2) in 1982Yo02. %p(to g.s. of ^{29}P)=100 4 (2012Ai23).
5912 [‡]	(3,4) [‡]			
6117 [‡]	1 ⁻ [‡]		1	E(level): other: 6110 50 with a proposed $J^\pi=(5^-)$ in 1972Gr39 appears to be a different level considering the proposed J^π . Additional experimental support is needed. The evaluators consider it as the same level; 6000 41 (2012Ai23). L: From 1982Yo02. %p(to g.s. of ^{29}P)=100 2 (2012Ai23). Relative population magnitude, R_{exp} =0.30-0.60 (1972Gr39).

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$^{28}\text{Si}(^3\text{He},\text{n}),(^{12}\text{C},^{10}\text{Be})$ **1982Yo02,1967Mc03,1988Kr11 (continued)** ^{30}S Levels (continued)

E(level) [†]	J ^π †&	Comments
6240 [@] 42		Proposed configuration: $\nu((f_{7/2})^{+1}(s_{3/2})^{+1})$ (1972Gr39 – $J^\pi=(5^-)$). E(level): other: 6233 in 1982Yo02. %p(to g.s. of ^{29}P)=100 6 (2012Al23).
6393 [‡]	0 ⁺ [‡]	J^π : assigned in 1982Yo02, based on a flat n-p correlation pattern.
6584 [‡]	(2,3) [‡]	
6700		E(level): from ($^{12}\text{C},^{10}\text{Be}$) (1988Kr11) strongly populated. Analogue state of ^{30}Si at 7043.17 ($J^\pi=5^-$). Configuration: $\nu((d_{3/2})^{+1}(f_{7/2})^{+1})_{5-}$ (1988Kr11 – quoted from literature).
6730 [@] 44	2 ⁺ [@]	%p(to g.s. of ^{29}P)=14 4, %p(to 1383 level of ^{29}P)=86 6.
6810 [#]		
6838 [#]		
6919 [‡]	(3,4) [‡]	
7133 [‡]	(1,2) [‡]	
7180 [@] 41	3 ⁻ [@]	%p(to g.s. of ^{29}P)=28 5, %p(to 1383 level in ^{29}P)=64 7, %p(to 1954 level in ^{29}P)=8 2 (2012Al23).
7294		
7330 [@] 44	(2 ⁺) [@]	E(level), J^π : other: 7338 and J=(1,2) in 1982Yo02. %p(to g.s. of ^{29}P)=63 5, %p(to 1954 level in ^{29}P)=37 9.
7420 [@] 45	(4 ⁺) [@]	E(level): other: 7475 in 1982Yo02. %p(to g.s. of ^{29}P)=37 8, %p(to 1383 level in ^{29}P)=43 6, %p(to 1954 level in ^{29}P)=20 4 (2012Al23).
7910 [@] 49		%p(to g.s. of ^{29}P)=58 10, %p(to 1954 level in ^{29}P)=38 25, %p(to 2423 level in ^{29}P)=4 2 (2012Al23).
8060 [@] 51		%p(to g.s. of ^{29}P)=48 5, %p(to 1383 level in ^{29}P)=17 7, %p(to 1954 level in ^{29}P)=25 10, %p(to 2423 level in ^{29}P)=10 8 (2012Al23).
8300		E(level): from ($^{12}\text{C},^{10}\text{Be}$) (1988Kr11) strongly populated. Analogue state of ^{30}Si at 8930 ($J^\pi=(6^+)$) – noted as 8.95 MeV in 1988Kr11. Configuration: $\nu((f_{7/2})^{+2})_{6+}$ (1988Kr11 – quoted from literature).
8680 [@] 44		%p(to g.s. of ^{29}P)=10 2, %p(to 1383 level in ^{29}P)=25 8, %p(to 1954 level in ^{29}P)=24 8, %p(to 2423 level in ^{29}P)=3 1, %p(to 3448 level in ^{29}P)=38 10 (2012Al23).
9220 [@] 41		%p(to g.s. of ^{29}P)=10 3, %p(to 1383 level in ^{29}P)=19 6, %p(to 1954 level in ^{29}P)=23 5, %p(to 2423 level in ^{29}P)=6 2, %p(to 3448 level in ^{29}P)=42 8 (2012Al23).
9670 [@] 41		%p(to g.s. of ^{29}P)=13 3, %p(to 1383 level in ^{29}P)=17 6, %p(to 1954 level in ^{29}P)=23 6, %p(to 2423 level in ^{29}P)=20 7, %p(to 3448 level in ^{29}P)=27 5 (2012Al23).
9900	(6 ⁺)	E(level), J^π : from ($^{12}\text{C},^{10}\text{Be}$) (1988Kr11) strongly populated, $\sigma(\theta)$ and DWBA analysis. Analogue state of ^{30}Si at 10670 ($J^\pi=6^+$).
10000 [@] 41		%p(to g.s. of ^{29}P)=11 5, %p(to 1383 level in ^{29}P)=12 6, %p(to 1954 level in ^{29}P)=11 6, %p(to 2423 level in ^{29}P)=10 7, %p(to 3448 level in ^{29}P)=56 10 (2012Al23).
10500 [@] 43		%p(to g.s. of ^{29}P)=4 1, %p(to 1383 level in ^{29}P)=26 8, %p(to 1954 level in ^{29}P)=30 9, %p(to 3106 level in ^{29}P)=8 3, %p(to 3448 level in ^{29}P)=19 6, %p(to 4343 level in ^{29}P)=13 4 (2012Al23).
10650 [@] 43		
10830 [@] 40		
11000 [@] 35		
11200 [@] 32		
11300 [@] 32		
11380 [@] 26		
11450 [@] 24		
11560 [@] 23		
11620 [@] 26		
11710 [@] 20		

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$^{28}\text{Si}(^3\text{He},\text{n}),(^{12}\text{C},^{10}\text{Be})$ [1982Yo02](#),[1967Mc03](#),[1988Kr11](#) (continued)

^{30}S Levels (continued)

E(level)[†]

11770[@] 19

11860[@] 20

[†] From [1973Ku15](#), except otherwise noted. J^π based on model calculation and γ -ray correlation studies.

[‡] From [1982Yo02](#). J^π from neutron proton angular correlation measurement assigned in [1982Yo02](#).

From [1982Yo02](#).

@ From [2012Al23](#).

& From L values, except where otherwise noted.

^a From [1967Mc03](#), based on $\sigma(\theta)$ and DWBA calculations, except where otherwise noted.