^{30}Si(p,p):resonances 1976Ou01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 184, 29 (2022)	24-Jun-2022

1976Ou01: E=1.1-3.0 MeV using high resolution proton beam of the TUNL 3 MV Van de Graaff accelerator with analyzer-homogenizer system. Beam FWHM=350-450 eV. Highly enriched SiO_2 targets (95.55% ^{30}Si). Protons detected using surface barrier detectors at (160°, 135°, 105°, 90°) lab angles. Data taken in steps of 400 eV or less. R-matrix analysis for spins and parities. See also thesis 1975OuZY. Absolute energy calibration based on ^{7}Li(p,n) threshold of 1.8806 MeV.

1966Wa07: 3 MeV protons using Utrecht HVEC Van de Graaff generator. Enriched very thin quartz targets (65% ^{30}Si). Surface barrier detectors for measuring scattered protons. NaI detector for γ-ray detection. Data analyzed by breaking up the scattering into 3 terms: a Rutherford term, a resonance term, and an interference term. Hard sphere scattering ignored. Other paper by the same group: 1967Wa25.

Other (with poor resolution): 1962Va33.

^{31}P Levels

E(level)[†]	J^π[‡]	Γ[&]	Comments
8459.5 *3*	(3/2,5/2)$^+$	2 eV *1*	E(level): E(p)=1202.0 *3*.
8543.4 *3*	1/2$^-$[#]	54 eV *10*	E(level): E(p)=1288.8 *3*.
8551.7 *3*	1/2$^+$[#]	0.31 keV *4*	E(level): E(p)=1297.3 *3*.
8554.7 *3*	3/2$^-$[#]	210 eV *25*	E(level): E(p)=1300.5 *3*.
8574.7 *3*	(3/2,5/2)$^+$ [@]	7 eV *5*	E(level): E(p)=1321.1 *3*.
8582.9 *3*	1/2$^-$	50 eV *10*	E(level): E(p)=1329.6 *3*.
8640.8 *3*	(3/2,5/2)$^+$	5 eV *3*	E(level): E(p)=1389.4 *3*.
8737.5 *3*	(3/2)$^+$[#]	20 eV *5*	E(level): E(p)=1489.4 *3*.
8756.9 *3*	(3/2,5/2)$^+$	3 eV *2*	E(level): E(p)=1509.4 *3*.
8763.9 *3*	1/2$^+$[#]	1.45 keV *15*	E(level): E(p)=1516.7 *3*.
8839.2 *3*	(5/2,7/2)$^-$	1 eV *1*	E(level): E(p)=1594.5 *3*.
8902.8 *3*	1/2$^+$[#]	90 eV *15*	E(level): E(p)=1660.3 *3*.
8909.7 *3*	(3/2,5/2)$^+$	1 eV *1*	E(level): E(p)=1667.4 *3*.
8936.2 *3*	(3/2,5/2)$^+$	3 eV *2*	E(level): E(p)=1694.8 *3*.
9009.9 *3*	5/2$^+$[#]	65 eV *20*	E(level): E(p)=1771.0 *3*.
9047.0 *3*	3/2$^-$[#]	9.3 keV *9*	E(level): E(p)=1809.3 *3*.
9068.3 *3*	(3/2,5/2)$^+$ [@]	16 eV *5*	E(level): E(p)=1831.3 *3*.
9112.0 *3*	(5/2,7/2)$^-$	1 eV *1*	E(level): E(p)=1876.5 *3*.
9114.6 *3*	(5/2)$^+$[#]	22 eV *7*	E(level): E(p)=1879.2 *3*.
9126.4 *3*	(3/2,5/2)$^+$	3 eV *2*	E(level): E(p)=1891.4 *3*.
9129.8 *3*	(3/2,5/2)$^+$ [@]	4 eV *2*	E(level): E(p)=1894.9 *3*.
9175.3 *3*	3/2$^-$[#]	80 eV *15*	E(level): E(p)=1941.9 *3*.
9225.7 *3*	1/2$^-$[#]	4.0 keV *4*	E(level): E(p)=1994.0 *3*.
9238.4 *3*	(3/2)$^+$	150 eV *15*	E(level): E(p)=2007.1 *3*.
9253.1 *3*	(5/2,7/2)$^-$	3 eV *1*	E(level): E(p)=2022.3 *3*.
9290.5 *3*	3/2$^-$	9.8 keV *10*	E(level): E(p)=2061.0 *3*.
9362.4 *3*	3/2$^-$	10.0 keV *10*	E(level): E(p)=2135.3 *3*.
9399.8 *3*	1/2$^+$	0.50 keV *8*	E(level): E(p)=2174.0 *3*.
9412.7 *3*	7/2$^-$	0.50 keV *8*	E(level): E(p)=2187.3 *3*.
9441.0 *3*	(5/2)$^+$	180 eV *20*	E(level): E(p)=2216.5 *3*.
9448.6 *3*	(5/2)$^+$	0.45 keV *5*	E(level): E(p)=2224.4 *3*.
9522.2 *3*	3/2$^-$	22.0 keV *22*	E(level): E(p)=2300.5 *3*.
9533.8 *3*	(3/2,5/2)$^+$	15 eV *10*	E(level): E(p)=2312.5 *3*.
9575.9 *3*	(3/2,5/2)$^+$	22 eV *10*	E(level): E(p)=2356.0 *3*.
9578.6 *3*	3/2$^-$	20.0 keV *20*	E(level): E(p)=2358.8 *3*.
9583.2 *3*	1/2$^+$	3.8 keV *4*	E(level): E(p)=2363.5 *3*.

Continued on next page (footnotes at end of table)

^{30}Si(p,p):resonances 1976Ou01 (continued)

^{31}P Levels (continued)

E(level)†	J^{π}‡	Γ&	Comments
9718.2 *3*	(5/2,7/2)$^-$	30 eV *10*	E(level): E(p)=2503.1 *3*.
9720.6 *3*	3/2$^-$	24.0 keV *24*	E(level): E(p)=2505.5 *3*.
9755.5 *3*	(3/2,5/2)$^+$	3 eV *2*	E(level): E(p)=2541.6 *3*.
9759.1 *3*	(3/2,5/2)$^+$	20 eV *7*	E(level): E(p)=2545.3 *3*.
9764.9 *3*	(3/2)$^+$	0.20 keV *5*	E(level): E(p)=2551.3 *3*.
9764.9 *3*	(3/2)$^-$	0.30 keV *7*	E(level): E(p)=2551.3 *3*.
9786.4 *3*	3/2$^-$	50 keV *5*	E(level): E(p)=2573.6 *3*.
9814.4 *3*	(5/2,7/2)$^-$	12 eV *5*	E(level): E(p)=2602.5 *3*.
9816.9 *3*	3/2$^-$	150 eV *20*	E(level): E(p)=2605.1 *3*.
9819.4 *3*	3/2$^-$	4.5 keV *5*	E(level): E(p)=2607.7 *3*.
9839.2 *3*	(7/2)$^-$	66 eV *15*	E(level): E(p)=2628.1 *3*.
9842.9 *3*	(3/2,5/2)$^+$	50 eV *10*	E(level): E(p)=2632.0 *3*.
9868.5 *3*	3/2$^-$	0.35 keV *4*	E(level): E(p)=2658.4 *3*.
9906.6 *3*	3/2$^-$	0.35 keV *4*	E(level): E(p)=2697.8 *3*.
9928.1 *3*	5/2$^+$	170 eV *20*	E(level): E(p)=2720.0 *3*.
9945.1 *3*	(5/2)$^-$	125 eV *15*	E(level): E(p)=2737.6 *3*.
9962.9 *3*	1/2$^+$	5.0 keV *5*	E(level): E(p)=2756.0 *3*.
9998.3 *3*	1/2$^+$	8.0 keV *8*	E(level): E(p)=2792.6 *3*.
10019.5 *3*	(5/2,7/2)$^-$	1 eV *1*	E(level): E(p)=2814.5 *3*.
10044.8 *3*	5/2$^-$	0.22 keV *3*	E(level): E(p)=2840.7 *3*.
10090.4 *3*	(3/2)$^+$	90 eV *15*	E(level): E(p)=2887.8 *3*.
10091.5 *3*	1/2$^+$	180 eV *20*	E(level): E(p)=2888.9 *3*.
10092.9 *3*	3/2$^-$	0.27 keV *3*	E(level): E(p)=2890.4 *3*.
10099.5 *3*	3/2$^-$	1.00 keV *10*	E(level): E(p)=2897.2 *3*.
10117.3 *3*	1/2$^-$	3.4 keV *3*	E(level): E(p)=2915.6 *3*.
10153.2 *3*	1/2$^+$	4.0 keV *4*	E(level): E(p)=2952.7 *3*.

† Determined from E(p)(cm)+S(p), where S(p)=7296.553 *22* (2021Wa16) and E(p)(cm) deduced from listed E(p)(lab) values. 1976Ou01 state that absolute energies are accurate to within ≈3 keV, but relative energies over a small proton energy range are reproducible to within ≈0.3 keV. To preserve this relative accuracy, the level energies in this dataset show the relative uncertainty of 0.3 keV. Absolute uncertainty in proton and level energies should be 3 keV.

‡ As proposed by 1976Ou01 from their Hauser-Feshback analysis.

1966Wa07 report the same value.

@ 1966Wa07 report 5/2$^+$.

& From Γ_p measured by 1976Ou01; Γ_γ is negligible in most cases, $\Gamma=\Gamma_p$ is assumed.