^{1}H(^{34}Si,p):resonances 2012Im01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Lijie Sun and Jun Chen	NDS 211,1 (2026)	30-Sep-2025

$J^{\pi}=0^{+}$ for ^{34}Si ground state.

2012Im01: A ^{34}Si beam at 7×10^{4} pps and a purity of 97% was produced by the projectile fragmentation of a 63-MeV/nucleon ^{40}Ar primary beam and separated by the RIPS separator at RIKEN. The secondary target was a 10.9-mg/cm^{2} *5* polyethylene film. An incident energy of 4.4 MeV/nucleon *12* for the ^{34}Si beam was determined by the timing difference between a plastic scintillator and two PPACs placed upstream of the target. The PPACs also record the positions and angles of the projectiles incident upon the target. Outgoing particles were detected and identified by a three-layer ΔE-E telescope consisting of 0.5-mm DSSD, 1.5-mm silicon, and 1.5-mm silicon detectors mounted at 0° with an E_{lab} resolution σ=130 keV. Measured excitation functions of proton elastic scattering on ^{34}Si for $\theta_{lab} < 10°$ using thick target inverse kinematics. Deduced E_R, L-transfer, Γ_p, and Γ from R-matrix analysis for 8 resonances in the highly excited states in ^{35}P, which are isobaric analog states of ^{35}Si states.

^{35}P Levels

All data are from 2012Im01.

E(level)[†]	Γ	L	S[‡]	Comments
14938 *24*	<12.7 keV	0		Γ: from original value of 4.6 keV *81* in 2012Im01. E_R=2783 *24*, Γ_p=4.6 keV *28*.
15161 *3*	<4.4 keV	3	0.63 *16*	Γ: from original value of 1.6 keV *28* in 2012Im01. E_R=3006 *2*, Γ_p=1.6 keV *4*. IAR of the 7/2^{-} g.s. of ^{35}Si.
15306 *24*	<30.4 keV	2	0.19 *15*	Γ: from original value of 10.4 keV *200* in 2012Im01. E_R=3151 *24*, Γ_p=3.3 keV *27*.
15964 *18*	84 keV *25*	2	0.79 *20*	E_R=3809 *18*, Γ_p=26.7 keV *69* in 2012Im01.
16145 *36*	354 keV *87*	1	1.37 *32*	E_R=3990 *36*, Γ_p=185 keV *43*.
16605 *44*	0.22 MeV *15*	0	0.45 *28*	E_R=4450 *44*, Γ_p=58.4 keV *370*.
17254 *12*	<11.6 keV	2	0.04 *1*	Γ: from original value of 3.8 keV *78* in 2012Im01. E_R=5099 *12*, Γ_p=3.8 keV *9*.
17355 *15*	32 keV *22*	1	0.12 *7*	E_R=5200 *15*, Γ_p=20.9 keV *120*.

[†] Excitation energies are deduced by evaluators from $E_R+S_p(^{35}P)$, where $S_p(^{35}P)$=12155.1 *20* (2021Wa16). E_R given in 2012Im01 are in the center-of-mass system.

[‡] Spectroscopic factors are derived from Γ_p using the formula from 1968Th07 as described in 2012Im01.