$^{1}H(^{34}Si,p)$:from IAR 2012Im01

(p,p) elastic scattering on 0^+ ^{34}Si g.s. in inverse kinematics.

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(5) mg/cm^2 polyethylene film. An incident energy of 4.4(12) MeV/nucleon 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 θ_{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.

IARs observed by 2012Im01 in ^{35}P are related to the corresponding β^--decay parent states in ^{35}Si.

^{35}Si Levels

Relationship between IAR in ^{35}P and corresponding β^--decay parent states in ^{35}Si: $E_x(^{35}P)=E_x(^{35}Si)+Q_{\beta-}(^{35}Si)+\Delta_c-\delta_{pn}$, with $E_x(^{35}P)=E_R(c.m.)+S(p)(^{35}P)$; Δ_c and δ_{pn} the Coulomb displacement energy and the mass difference between proton and neutron, $\Delta_c-\delta_{pn}$=4623 keV; $S(p)(^{35}P)$=12190 *14* and $Q_{\beta-}(^{35}Si)$=10500 *40* from 2012Wa38.

E(level)†	J^{π}‡	Comments
0	$7/2^-$	E(level): IAR resonance energy in ^{35}P: E_R(c.m.)=3006 *2*, corresponding to IAR state in ^{35}P at 15196 *14* (2012Im01).
910	$3/2^-$	E(level): 984 *36* from IAR resonance energy in ^{35}P: E_R(c.m.)=3990 *36*, corresponding to IAR state in ^{35}P at 16180 *39* (2012Im01).
974	$3/2^+$	E(level): 803 *18* from IAR resonance energy in ^{35}P: E_R(c.m.)=3809 *18*, corresponding to IAR state in ^{35}P at 15999 *23* (2012Im01).
1444?	$(1/2^+)$	E(level): rounded value of 1444 *44* from IAR resonance energy in ^{35}P: E_R(c.m.)=4450 *44*, corresponding to possible IAR state in ^{35}P at 16640 *46* (2012Im01).
2168	$5/2^+$	E(level): 2093 *12* from IAR resonance energy in ^{35}P: E_R(c.m.)=5099 *12*, corresponding to IAR state in ^{35}P at 17289 *18* (2012Im01).
2194?	$(1/2^-,3/2^-)$	E(level): rounded value of 2194 *15* from IAR resonance energy in ^{35}P: E_R(c.m.)=5200 *15*, corresponding to possible IAR state in ^{35}P at 17390 *21* (2012Im01).

† Rounded values from Adopted Levels, unless otherwise noted. Values deduced from difference of measured IAR resonance energy E_R(c.m.) for ^{35}P in 2012Im01 are given as comments.

‡ R−Matrix assumed J=L+1/2 when fitting the measured excitation functions of the proton elastic scattering (2012Im01).