

$^1\text{H}(^{34}\text{Si},\text{p})$ :resonances **2012Im01**

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

**2012Im01**: A  $^{34}\text{Si}$  beam at  $7 \times 10^4$  pps and a purity of 97% was produced by the projectile fragmentation of a 63-MeV/nucleon  $^{40}\text{Ar}$  primary beam and separated by the RIPS separator at RIKEN. The secondary target was a 10.9(5) mg/cm<sup>2</sup> polyethylene film. An incident energy of 4.4(12) MeV/nucleon for the  $^{34}\text{Si}$  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  $\Delta E$ -E telescope consisting of 0.5-mm DSSD, 1.5-mm silicon, and 1.5-mm silicon detectors mounted at  $0^\circ$  with an  $E_{\text{lab}}$  resolution  $\sigma=130$  keV. Measured excitation functions of proton elastic scattering on  $^{34}\text{Si}$  for  $\theta_{\text{lab}} < 10^\circ$  using thick target inverse kinematics. Deduced  $E_R$ , L-transfer,  $\Gamma_p$ , and  $\Gamma$  from R-matrix analysis for 8 resonances in the highly excited states in  $^{35}\text{P}$ , which are isobaric analog states of  $^{35}\text{Si}$  states.

 $^{35}\text{P}$  Levels

$E(\text{level})^\dagger$	$\Gamma$	$L$	$S^\ddagger$	Comments
14938 24	<12.7 keV	0		$E_R=2783$ 24, $\Gamma_p=4.6$ keV 28, $\Gamma=4.6$ keV 81 in <a href="#">2012Im01</a> .
15161 3	<4.4 keV	3	0.63 16	$E_R=3006$ 2, $\Gamma_p=1.6$ keV 4, $\Gamma=1.6$ keV 28 in <a href="#">2012Im01</a> . IAR of the $7/2^-$ g.s. of $^{35}\text{Si}$ .
15306 24	<30.4 keV	2	0.19 15	$E_R=3151$ 24, $\Gamma_p=3.3$ keV 27, $\Gamma=10.4$ keV 200 in <a href="#">2012Im01</a> .
15964 18	84 keV 25	2	0.79 20	$E_R=3809$ 18, $\Gamma_p=26.7$ keV 69 in <a href="#">2012Im01</a> .
16145 36	0.35 MeV 9	1	1.37 32	$E_R=3990$ 36, $\Gamma_p=185$ keV 43, $\Gamma=354$ keV 87 in <a href="#">2012Im01</a> .
16605 44	0.22 MeV 15	0	0.45 28	$E_R=4450$ 44, $\Gamma_p=58.4$ keV 370, $\Gamma=215$ keV 150 in <a href="#">2012Im01</a> .
17254 12	<11.6 keV	2	0.04 1	$E_R=5099$ 12, $\Gamma_p=3.8$ keV 9, $\Gamma=3.8$ keV 78 in <a href="#">2012Im01</a> .
17355 15	32 keV 22	1	0.12 7	$E_R=5200$ 15, $\Gamma_p=20.9$ keV 120 in <a href="#">2012Im01</a> .

<sup>†</sup> Excitation energies are deduced by evaluators from  $E_R+S_p(^{35}\text{P})=12155.1$  20 ([2021Wa16](#)).  $E_R$  given in [2012Im01](#) are in the center-of-mass system.

<sup>‡</sup> Spectroscopic factors are derived from  $\Gamma_p$  using the formula from [1968Th07](#) as described in [2012Im01](#).