

$^1\text{H}(^{25}\text{Al},\text{P})$ 2014Ju02,2012Ch04,2005Mo28

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia and A. M. Hurst		NDS 134, 1 (2016)	1-Feb-2016

Additional information 1.

 $J^\pi(^{25}\text{Al})=5/2^+$.

2014Ju02: $E(^{25}\text{Al})=71.58$ MeV 54 radioactive beam of 3.3×10^4 pps was produced via the $^3\text{He}(^{24}\text{Mg},\text{d})$ reaction with the 7.5 MeV/nucleon primary ^{24}Mg beam from the RIKEN AVF cyclotron on ^3He gas target. The secondary beam ions were separated by the Center for Nuclear Study (CNS) Radioactive Ion Beam (CRIB) separator and identified with two parallel plate avalanche counters (PPACs). Target was thick hydrogen gas at a pressure of 330 Torr stored in a cylinder with a 2.5 μm thick Havar foil window for ^{25}Al beam entrance. Scattered protons were detected using $\Delta\text{E}-\text{E}$ telescopes of a double-sided 16×16 -strip position-sensitive silicon detector as the ΔE detector and two 1500- μm thick single-channel silicon strip detector as the E detectors (SSDs). Measured $\sigma(E_p,\theta)$. Deduced resonance energies, widths, J^π from R-Matrix analysis. Comparison with shell-model calculations and previous measurements.

2012Ch04: a secondary ^{25}Al beam of 1.2×10^6 pps at $E_{\text{lab}}=3.4$ -MeV/nucleon was produced utilizing the reaction $^2\text{H}(^{24}\text{Mg},\text{m})^{25}\text{Al}$ with a 7.5-MeV/nucleon $^{24}\text{Mg}^{8+}$ primary beam from the RIKEN Azimuthally Varying Field (AVF) cyclotron incident upon a cooled ^2H gas target. The ^{25}Al ions were separated using the Center for Nuclear Study (CNS) Radioactive Ion Beam (CRIB) separator and delivered to a target comprising 6.58 mg/cm² of $(\text{C}_2\text{H}_4)_n$. Scattered particles were detected using three sets of $\Delta\text{E}-\text{E}$ telescopes each consisting of a double-sided 16×16 -strip position-sensitive silicon detector for the ΔE detector and two single-channel silicon- strip detectors for the E detector. Measured $d\sigma/d\Omega(E_p,\theta)$. Deduced resonance energies, widths, J^π from R-Matrix analysis. Comparison with shell-model analysis and previous measurements.

2005Mo28: Elastic scattering of ^{25}Al radioactive beam to study resonances above proton threshold in ^{26}Si . Primary ^{24}Mg beam (7.434 MeV/nucleon) bombarded ^3He gas target (0.32 mg/cm²). $E(^{25}\text{Al})(\text{lab})=3.4407$ MeV/nucleon, polyethylene (ch_2) target (8.24 mg/cm²), silicon counter $\Delta\text{E}-\text{E}$ telescopes at 0° and 17° used for charged-particle identification and energy measurement. Proton energy spectrum of resonance states above threshold deduced from $^{25}\text{Al} + ^1\text{H}$ excitation function; resonance region covered $E(\text{c.m.}) = 0.5\text{-}3$ MeV (approx.). See also [2005MOZR](#), [2005MOZU](#), [2005MOZZ](#), and [2004MOZY](#).

 ^{26}Si Levels

$E(\text{level})^\dagger$	J^π^\ddagger	Γ_p^\ddagger	L^\ddagger	Comments
6300@				
6380@				
6470@				
6787@				
6880@				
7019@				
7147 27	2 ⁺	2.7 keV 1	0	$E(\text{p}(\text{c.m.}))=1633$ 27; other $\$E(\text{p}(\text{c.m.}))=1648.5$ keV 14 (2012CH04). Resonance strength $\omega\gamma=4.17$ meV. $E(\text{level}): 7162$ 24 (2012Ch04). $\Gamma_p: 7$ keV 4 (2012Ch04).
7401 28	4 ⁺	1.1 keV 1	2	$E(\text{p}(\text{c.m.}))=1887$ 28; other $\$E(\text{p}(\text{c.m.}))=1888.5$ keV 40 (2012CH04). Resonance strength $\omega\gamma=7.49$ meV. $E(\text{level}): 7402$ 45 (2012Ch04). J^π : Other value: 2 ⁺ (2012Ch04). $\Gamma_p: 6$ keV 4 (2012Ch04).
7484 28	2 ⁺	15.9 keV 3	0	$E(\text{p}(\text{c.m.}))=1970$ 28; other $\$E(\text{p}(\text{c.m.}))=1970.5$ keV 13 (2012CH04). Resonance strength $\omega\gamma=4.17$ meV. $E(\text{level}): 7484$ 24 (2012Ch04). $\Gamma_p: 46$ keV 11 (2012Ch04). L: Other value: L=2 (2002Ba25).
7654 29	(2 ⁺ ,3 ⁺)	30.1 keV 5	0	Γ_p for J=2. $\Gamma_p=19.5$ keV 3 for J=3. $E(\text{p}(\text{c.m.}))=2140$ 29; other $\$E(\text{p}(\text{c.m.}))=2190.5$ keV 13 (2012CH04). Resonance strength $\omega\gamma=4.17$ meV.

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$^1\text{H}(^{25}\text{Al,P})$ [2014Ju02,2012Ch04,2005Mo28](#) (continued) ^{26}Si Levels (continued)

<u>E(level)[†]</u>	<u>J^π[‡]</u>	<u>Γ_p[‡]</u>	<u>L[‡]</u>	Comments
7704 13	3+ [#]	41 [#] keV 6		
7866 29	1 ⁻	22.8 keV 13	1	E(p)(c.m.)=2352 29. Resonance strength ωγ=129 meV. E(level): 7900 (2005Mo28).
7977 30	(2 ⁺ ,3 ⁺)	4.5 keV 3	0	Γ _p for J=2. Γ _p =3.6 keV 2 for J=3. E(p)(c.m.)=2463 30; other \$E(p)(c.m.)=2501.5 keV 14 (2012CH04). Resonance strength ωγ=5.83 meV. E(level): 8015 14 (2012Ch04). J ^π : 3 ⁺ (2012Ch04). Γ _p : 15 keV 5 (2012Ch04).
8120 [@]				
8356 12	3+ [#]	27 [#] keV 8		E(p)(c.m.)=2842.5 keV 12.

[†] Deduced by evaluators using E(p)(c.m.) and of S(p)(^{26}Si)=5513.8 keV 5 (2012Wa38), except otherwise noted.

[‡] Extracted from R-Matrix fit to the experimental cross section of proton resonances in 2014Ju02, except where noted. Uncertainties on Γ_p are statistical only and may be underestimated.

[#] Extracted from R-Matrix fit to the experimental cross section of proton resonances in 2012Ch04. A systematic uncertainty of 20 keV is combined in quadrature to the statistical uncertainty on the level energies listed in Table II of 2012Ch04.

[@] Taken from particle-intensity measurements in 2005Mo28.