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The 26gAl(p,g)27Si reaction in Novae

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The strength of the 188 keV resonance in the 26gAl(p,g)27Si reaction has been measured directly in inverse kinematics using the DRAGON recoil separator at TRIUMF-ISAC. Radioactive 26Al beams with peak intensities of 5 x 10^9 ions/sec were utilised in conjunction with a windowless, recirculating hydrogen gas target. Recoil 27Si ions were separated and detected with a double-sided silicon strip detector in coincidence with capture gamma-rays at the target position in a highly efficient BGO detector array. Background from random coincidence was separated using time-of-flight through the length of the separator.
Measured silicon charge state distributions using a 28Si beam, combined with stopping power information measured in the gas target allowed determination of the strength of this resonance at the level of <20% error. In addition, the resonance energy was measured via the distribution of gamma-ray hits in the BGO array, leading to the conclusion that it is lower than previously thought.
The 188 keV resonance dominates the reaction rate at typical Oxygen-Neon Nova temperatures and the formation of 26Al in Novae depends sensitively on the value of this rate.
We have found a value of resonance strength differing from the only existing unpublished measurement that has been used in the reaction networks so far in Nova nucleosynthesis models.
The results of the experiment will help determine the importance of Novae as originators of Galactic 26Al compared to other sources, and we discuss the implications of the measurement in this context.

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