

Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Isomeric Contributions of ^{24}Al to the $^{24}\text{Al}(\text{p},\gamma)$ Reaction¹

NATHAN GERKEN, SERGIO ALMARAZ, BENJAMIN ASHER, LAGY BABY, EILENS LOPEZ SAAVEDRA, ASHTON MORELOCK, JESUS PERELLO, Florida State University — The $^{24}\text{Al}(\text{p},\gamma)^{25}\text{Si}$ reaction is relevant in the rp-process. Variations in the rate of this reaction can affect the abundances of several stable isotopes. Experimental information of this reaction is scarce, and the isomeric contributions have not yet been experimentally studied. Due to the large difference between the spins of the ground state ($t_{1/2} = 2.053\text{s}$, $J^\pi = 4^+$) and the isomeric first excited state ($E_{ex} = 0.426\text{ MeV}$, $t_{1/2} = 130\text{ms}$, $J^\pi = 1^+$), each component could contribute separately to the overall reaction rate. A radioactive beam of ^{24}Na mostly in its isomeric state has been developed and used to study the $^{24}\text{Na}(\text{d},\text{p})$ reaction in inverse kinematics at the John D Fox Accelerator Laboratory at Florida State University. The $^{24}\text{Na}(\text{d},\text{p})$ reaction was then used to study the astrophysically relevant $^{24}\text{Al}(\text{p},\gamma)^{25}\text{Si}$ reaction via the mirror symmetry of ^{25}Na and ^{25}Si . Spectroscopic information from the contributions of the isomeric state of ^{24}Al to the overall rate of the $^{24}\text{Al}(\text{p},\gamma)$ reaction has been constrained and will be presented.

¹This work was partially supported by the NSF under the grant PHY-1712953.

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Date submitted: 24 Jun 2020

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