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A Low Energy Measurement of the ^{13}C(α,n) Reaction[1] REBECCA TOOMEY, Rutgers Univ, MICHAEL FEBBRARO, STEVEN PAIN, Oak Ridge National Laboratory, JOLIE CIZEWSKI, Rutgers Univ — The slow neutron capture process (s process) is a key mechanism in heavy-element synthesis, reaching up to ^{209}Bi. The s process creates elements along the line of beta-stability via neutron capture and beta decay in a low neutron flux environment in AGB stars. The dominant source of neutrons for the s process is the ^{13}C(α,n) reaction. At the low energies occurring in these stellar conditions, this reaction cross section is very low, making direct measurement of the reaction rate difficult. Currently the state-of-the-art measurements using high-efficiency moderated neutron counter detectors have constrained this cross section down to approximately 300 keV - still well above stellar conditions, therefore requiring extrapolation of the S factor into the Gamow window ($\sim$140-230 keV). This talk will focus on the motivation and preparation for low-energy measurements of the ^{13}C(α,n) reaction using a neutron spectroscopic technique with the aim of reducing uncertainties in current measurements, and also attempt measurements at lower energies. Background measurements and the characterisation of the experimental set up from the measurement of ^{13}C(α,n) at higher energies at the University of Notre Dame will be presented.

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