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Probing the s-process via Indirect Measurement of $^{22}Ne(\alpha,\gamma)^{26}Mg$ Reaction

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The slow neutron capture process (s-process) creates almost half of the elements heavier than iron in the universe. One of the most important neutron sources for the s-process is the $^{22}Ne(\alpha,n)^{25}Mg$ reaction, which competes with the $^{22}Ne(\alpha,\gamma)^{26}Mg$ reaction. The current nuclear data for these reactions show great discrepancies. Thus, in order to understand the synthesis of heavy elements, it is crucial to study the ratio between these two reactions.

Using the EMMA mass spectrometer and TIGRESS γ-ray spectrometer at TRIUMF, we are able to indirectly measure the $^{22}Ne(\alpha,\gamma)^{26}Mg$ reaction. The indirect measurement involves bombarding a LiF target with a $3MeV/u$ ^{22}Ne beam. A silicon detector is used to detect light ejectiles, the TIGRESS array is used to detect the γ-rays from the reactions, and the EMMA spectrometer to select the ^{26}Mg recoils. Using different coincidence measurements between the three detectors allows us to measure the α particle spectroscopic factors for ^{26}Mg states above the neutron threshold. Preliminary results from the measurements will be discussed in this talk.

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