Contribution ID: **139** Type: **Invited Oral**

Direct Measurements of Astrophysical Capture Reactions using Recoil Separators

Thursday, 15 February 2024 19:15 (30 minutes)

The vast majority of the elements heavier than helium are formed in stellar environments through sequences of nuclear reactions and decays. Relevant stellar environments for nucleosynthesis include both quiescent burning as well as explosive environments such as novae, supernovae, X-ray bursts, and neutron star mergers. As part of the global effort to understand the origin of the elements, the rates of key nuclear reactions that contribute to nucleosynthesis processes must be well constrained. While a variety of techniques exist to estimate reaction rates theoretically, or to indirectly measure key reaction rates, the "gold standard" remains a direct measurement of the relevant cross-section, at the relevant stellar energies.

Recoil separators, which separate the desired heavy-ion products of astrophysical capture reactions from background, are a powerful tool for directly measuring astrophysical capture reactions in inverse kinematics. While particularly useful in studying reactions involving short-lived unstable species, they are also excellent tools for studying stable-ion reactions due to the clean selection of the desired reaction channel. In this talk, I will provide an overview of direct reaction measurement techniques using recoil separators, discussing recent high-profile results as example cases. I will also discuss new measurement techniques that are currently under development, including a new technique to precisely extract resonance energies, as well as direct measurements of (α, n) reactions that couple next-generation organic scintillators with a recoil separator.

Your Email

Greg.Christian@smu.ca

Supervisor

Supervisor Email

Affiliation

Saint Mary's University

Your current academic level,

Professor/researcher

Primary author: Prof. CHRISTIAN, Greg (Saint Mary's University)

Presenter: Prof. CHRISTIAN, Greg (Saint Mary's University)

Session Classification: Evening 1 - Feb. 15, 2024

Track Classification: Nuclear Structure