Friday

Oct. 11th

At 11:30 am

The Science and Technology of fusing neutron-rich light nuclei near and below the barrier

Abstract:

The investigation of neutron-rich nuclei both aids our understanding of fundamental nuclear science and provides valuable information for nuclear astrophysics. Of particular interest are the fusion reactions of neutron-rich nuclei which have been hypothesized as the heat source triggering an X-ray superburst. Examining fusion excitation functions for isotopic chains is a particularly sensitive tool in addressing this topic.

While radioactive beam facilities provide beams of neutron-rich nuclei, the intensity of these beams is generally low ($<10^6$ ions/s) with the most exotic beams available at the extremely low intensities ($< 10^3$ ions/s). Two approaches to measure fusion excitation functions will be presented and the complementary nature of the approaches discussed. Both methods involve direct measurement of the fusion cross-section through identification of the evaporation residues produced. Use an ETOF technique has allowed us to measure the fusion excitation functions for $^{18,19}O+^{12}C$, $^{39,41,45,47}K + ^{28}Si$, and $^{36,40,44}Ar + ^{28}Si$. The experimental results will be presented and compared with the predictions of various microscopic models. In order to enable measurement of the fusion cross-section for the most N/Z exotic beams, the design and construction of a new detector, MuSIC@Indiana will be described.

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Refreshments will be served at 11:15 am