Rate of N-Z equilibration in a deformed nuclear system

Andrea Jedele

Abstract:

The symmetry energy in the nuclear equation of state is a driving force for neutron-proton equilibration. The extent of equilibration is governed by the contact time and the gradient of the potential driving the equilibration. We have examined correlations between the largest two fragments (both isotopically identified) produced in collisions of 70Zn+70Zn at 35A MeV. Using the rotation angle as a clock, we observe a large difference in the average n-p asymmetry at short times. As time increases, the asymmetries converge toward each other, providing strong evidence for N-Z equilibration within a dynamically deformed quasi-projectile.

Measurements of proton-proton correlations with the upgraded FAUST array (FAUSTUPS)

Lauren Heilborn, Sherry J. Yennello

The nuclear Equation of State (EoS) is important to a more fundamental understanding of nuclear matter, particularly as manifest in neutron-proton asymmetric systems, such as neutron stars. Proton-proton (pp) correlation functions have been predicted to be sensitive to the density-dependence of the Symmetry Energy in the EoS. In order to extract this relationship, the Forward Array Using Silicon Technology (FAUST) has recently been upgraded to use position-sensitive silicons as the Delta-E detectors. In order to extract the position with a sensitivity of 200 um within a detector, a new method of position calibration for the array has been developed. Data has been collected from the reactions of 40Ar+70Zn,58Fe and 40Ca+58Ni at 40 MeV/nucleon. The three systems were chosen to include two that are the same total A, and two that are similar in total isospin content. Light charged particles have been measured, and preliminary results from this campaign will be shown.

Structure of 10N via 9C+p Resonance Scattering

Joshua Hooker

Abstract
The study of 10N through the reaction 9C(p,p)9C using a new time projection chamber (TexAT-P1) at the Cyclotron Institute at Texas A\&M University. Only one experiment before this study on 10N has claimed to have observed the ground state. We build on this result by providing a spin-parity assignment of the ground state and low-lying excited states in 10N. The mirror nucleus, 10Li, is not well known and also has uncertainty its spin-parity assignments and excitation energies in low-lying states. This nucleus is important to study as it can help explain the two neutron halo nucleus 11Li as its nuclear matter radius is as large as that of 208Pb.