

Virtual Joint Nuclear and Astrophysics Seminar

- When: Friday October 29th at 12:00 PM Central Time
- Where: ZOOM link:
<https://tamu.zoom.us/j/95700340712?pwd=dUxPbSswZG1yTlFyMC92eUdkS1RJdz09>
- Speakers: Pengsheng Wen and Paul Zivick

Constraining the nonanalytic terms in the isospin-asymmetry expansion of nuclear equation of state

By Pengsheng Wen

The nuclear symmetry energy (NSE) is defined as the difference between the energy per particle of pure neutron matter and proton-neutron symmetric nuclear matter at fixed density. Recent observations of neutron star gravitational wave and X-ray emissions as well as laboratory measurements of the neutron skin thickness of ^{208}Pb provide novel insight into the NSE. Meanwhile, the theoretical calculation of the equation of state shows the existence of nonanalytic contributions from isospin asymmetry to the nuclear symmetry energy. In this talk we will describe a new finite difference method to extract the fourth- and sixth-order regular and logarithmic contributions to the NSE with microscopic chiral two- and three-body forces. We find that in general the expansion coefficients of the nonanalytic logarithm terms are larger in magnitude than those of the corresponding regular terms (even-power) for the energy from second-order perturbation calculations. But overall, the normal terms give larger contributions to the ground state energy. The high-order terms are important to describe the proton fraction in beta-equilibrium nuclear matter. Different chiral potentials produce different values of those coefficients, which result in uncertainties for the proton fraction in the high-density region.

Understanding the Small Magellanic Cloud in the Age of HST and Gaia

By Paul Zivick

Despite being known to humans since prehistoric times, the past, present, and future of the Small Magellanic Cloud has remained frustratingly opaque. However, through a combination of simulations, dedicated photometric surveys, and significant advances in astrometry, we have slowly begun to piece together the role the SMC has played and the insights it may offer. In this talk I will present a brief overview of our shifting paradigm for the SMC, some of the interesting open questions regarding the SMC, and current work being done to address them.