Virtual Joint Nuclear and Astrophysics Seminar

- When: Friday January 29th at 12:00 PM CST
- Where: ZOOM link: https://tamu.zoom.us/j/93502613243
- Speakers: Maxwell Sorensen and Peter Ferguson

The Photon Strength Function of ^{60}Fe with DAPPER

By Maxwell Sorensen

^{60}Fe is seen in a variety of places on earth and in space even though it only has a half-life of 2.64 million years. Clearly ^{60}Fe must be produced recently in the galaxy. Since ^{60}Fe has a clear electromagnetic signature associated with it, it can be used to help model the stellar evolution of stars. Improved knowledge of the production reaction, ^{59}Fe(n,γ) ^{60}Fe, is needed in order to gain greater insight into these astrophysical observations. The photon strength function (PSF) is important in describing photon emission probabilities and thus it is important in describing this reaction. For some nuclei, experiments have shown an enhancement in the PSF at low energy. This “up-bend” could have a large effect on r-process nucleosynthesis. Experiments have shown an up-bend in both ^{56}Fe and ^{57}Fe nuclei. The PSF of ^{60}Fe will be probed using a ^{59}Fe(d,pγ) ^{60}Fe reaction. A new detector array is currently being constructed called DAPPER (Detector Array for Photons, Protons, and Exotic Residues). In this array the proton emitted from the reaction will be detected by an annular silicon detector, while the gamma arrays from the excited residue will be detected by ^{128}BaF$_2$ detectors. The results from two small scale test runs along with progress made in simulation, design, and detector testing for the final experiment will be presented.

The messy side of the Milky Way: using large surveys to explore our Galaxy’s halo

By Peter Ferguson

We are in an exciting era of large scale surveys in astronomy. Experiments such as SDSS, DES, and Gaia have revolutionized our understanding of the Milky Way; finding a myriad of substructures in our Galaxy's halo. These objects include dwarf galaxies, stellar streams, and completely disrupted satellites. Measurements of elemental abundances in many stars provide key information in identifying these substructures, through chemodynamics (chemical and kinematic information) and chemical tagging. I will review a few recent discoveries in this field and highlight some of the work we do at Texas A&M.