Virtual Joint Nuclear and Astrophysics Seminar

- When: Friday April 30th at 12:00 PM CDT
- Where: ZOOM link: https://tamu.zoom.us/j/93502613243
- Speakers: Jonathan Cohn and Curtis Hunt

Gas-dynamical mass measurement of the supermassive black hole in UGC 2698 with ALMA
By Jonathan Cohn

We present 0.14"-resolution Atacama Large Millimeter/submillimeter Array (ALMA) CO(2-1) observations of the circumnuclear gas disk in UGC 2698, a local compact galaxy. We fit gas-dynamical models to the ALMA data cube, assuming the CO emission originates from a dynamically cold, thin disk, and measure the mass of the supermassive black hole (BH) in UGC 2698 to be 2.46 billion solar masses, with an error budget dominated by systematic uncertainties of about 30%. UGC 2698 is part of a sample of nearby early-type galaxies that are plausible z~2 red nugget relics. We compare the BH mass in UGC 2698 to the BH masses of other relic galaxies in the sample and discuss the implications of our measurement on the BH-host galaxy scaling relations and the history of BH growth.

Study of T=5/2 states in ^{13}B with ^{12}Be(p,p)
By Curtis Hunt

Evolution of nuclear structure with increasing imbalance between protons and neutrons provides important insights into the nature of the nuclear force. Accurate experimental data on exotic nuclei are necessary to benchmark and guide the development of state-of-the-art microscopic nuclear theory. The unbound nucleus of ^{13}Be is an interesting example. The structure of the ground state of ^{13}Be is an open question. Theoretical Ab initio calculations give conflicting predictions for the ground state structure while experimental attempts to measure it directly have been inconclusive. Our goal is to determine the ground state structure and resolve this open question. Rather than measure ^{13}Be directly, though, we study the analogous T=5/2 states in ^{13}B. The strong force does not differentiate between protons and neutrons, thus the structure of states with the same isospin in nuclei with the same number of nucleons will be similar. To measure these states in ^{13}B the reaction ^{12}Be(p,p) was performed using the TexAT detector at TRIUMF. Analysis is nearing completion and preliminary results will be shown.