

# Virtual Joint Nuclear and Astrophysics Seminar

- When: Friday March 25<sup>th</sup> at 12:00 PM Central Time
- Where: ZOOM email [barbui@comp.tamu.edu](mailto:barbui@comp.tamu.edu) for the link
- Speakers: Heshani Jayatissa and Kate Pitchford

## **First direct measurement of the $^{13}\text{N}(\alpha,p)^{16}\text{O}$ reaction relevant for core-collapse supernovae**

By Heshani Jayatissa, Argonne National Laboratory, Lemont, IL

The  $^{13}\text{Na}(\alpha,p)^{16}\text{O}$  reaction affects the nucleosynthesis in core-collapse supernovae (CCSNe) for a range of relevant temperatures according to several recent sensitivity studies. The  $^{13}\text{Na}(\alpha,p)^{16}\text{O}$  reaction cross sections at astrophysical energies have only been deduced via various indirect methods and have never been measured directly. The first direct measurement of the total  $^{13}\text{Na}(\alpha, p) ^{16}\text{O}$  reaction cross sections was performed using a 34.6 MeV beam of radioactive  $^{13}\text{Na}$  and the active-target detector MUSIC at Argonne National Laboratory. Recently finalized results for the  $^{13}\text{Na}(\alpha,p)^{16}\text{O}$  reaction rate from this measurement will be presented.

## **Luminous Merger Between Two Star-forming Galaxies 1.7 Billion Years After the Big Bang**

By Kate Pitchford, Texas A&M University, College Station, TX.

The bulk of stellar and black hole mass buildup in galaxies occurs in the high-redshift Universe in short, intense bursts of star formation and black hole accretion. However, the exact role of these two processes in assembling galaxies, as well as how much they affect one another, remains unclear. It is thus important to create case studies of high-redshift systems in which they can be studied together to determine how they are triggered and proceed. To this end, I will focus on the SDSS1607 system at  $z = 3.65$ , which harbors a luminous quasar and is forming new stars at rates in excess of  $1000 M_{\odot}\text{yr}^{-1}$ . I will first discuss older sub-millimeter observations, which show the system is likely a merger between two galaxies, one of which houses the quasar. I will then describe our follow-up study using the Hubble Space Telescope, the results of which are consistent with such a merger scenario.