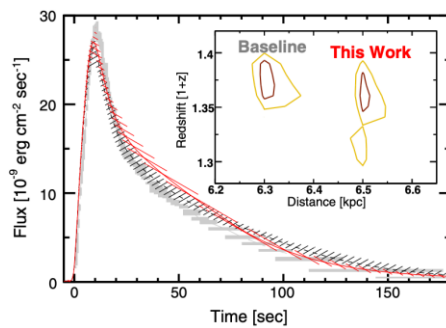
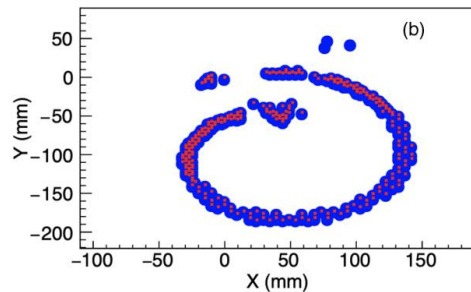
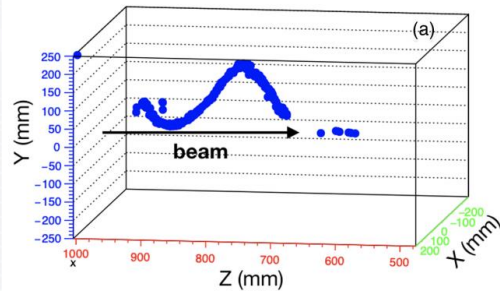


# Refining the understanding of x-ray burst light curves: the direct measurement of the $^{22}\text{Mg}(\alpha,p)^{25}\text{Al}$ reaction



X-ray burst (XRB) light curves, powered by surface nuclear burning on an accreting neutron star, are a direct observable that when compared to models provide an independent way to constraint the neutron star mass-radius relation. The  $^{22}\text{Mg}(\alpha,p)^{25}\text{Al}$  reaction, identified as one of the most important for understanding XRB light curves, has been measured using a radioactive beam and active-target detector at the NSCL. **This first direct measurement found that the cross section is nearly a factor of 10 lower compared to the statistical model predictions.** The new cross sections allow for updated reactions rates and a recalibration of neutron star parameters for XRBs such as GS1826-24, where the neutron star was found to be less compact than originally thought.