

# Determination of the Neutron Capture Cross Section of $^{134}\text{Xe}$ at $E_n=4.2$ and $5.5$ MeV

Andrew Hall

TTU Physics

Neutrinoless double beta decay experiments using  $^{136}\text{Xe}$  contain a significant amount of  $^{134}\text{Xe}$ . Understanding backgrounds in double beta decay experiments is extremely important. The ultimate goal of this experiment is to determine the neutron capture cross section of  $^{134}\text{Xe}$ . This calculation will aid in correcting for neutron-induced background in measurements. After activating  $^{134}\text{Xe}$  in a neutron beam,  $\gamma$  rays from the resulting decay of  $^{135}\text{Xe}$  are measured over time. This decay allows us to determine how much  $^{135}\text{Xe}$  was produced, and calculate the neutron capture cross section of  $^{134}\text{Xe}$ . The immediate goals of data analysis were to calibrate the detectors used, determine their efficiency, and calculate the neutron capture cross section of  $^{134}\text{Xe}$ .