Fission Fragment Spectrometer Improvements for correlated A, Z, E, and fission tagged gamma-ray data

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Abstract:

Nuclear data needs call for measurement of high resolution fragment yields and energies for ^{239}Pu and ^{235}U fission. This project will be on modifications and improvements to the existing UNM Fission Fragment Spectrometer (FFS). The UNM FFS uses time of flight and energy measurements to determine the mass of fission fragments as well as their charge. There is a need for quasi-prompt gammas for studying fission daughter isomers, while quasi-prompt gammas from fission parent isomers are important to understanding pre-fission nuclear shapes for theory. The major modification being made to the system are the addition of gamma ray detectors to detect the prompt and quasi-prompt in coincidence with the fragment measurements from the fission event. This means that the yield data is correlated with a gamma ray spectrum which then allows for higher confidence levels on data collected at high neutron energies where fission cross sections are lower.

Bio:

Phoenix Baldez is a PhD student in nuclear engineering at the University of New Mexico (UNM). He received his Bachelors and Masters from UNM as well in 2015 and 2017 respectively. He has worked on projects involving uranium contamination in soil near abandoned uranium mines, designing and implementing a He-3 free neutron detector at PNNL, an imaging system for special nuclear material, dose to electronics from x-ray imaging, 3d tracking of x-rayed objects and finally his PhD project on fission fragment spectroscopy.