

NUCLEAR SEMINAR SERIES

Prof. Michelle Kuchera
Davidson College

Monday, March 4
4:00 pm - Rm 184 NSH

***Machine Learning for event simulation
and classification in the Active-Target
Time Projection Chamber***

The Active-Target Time Projection Chamber (AT-TPC) is a high-efficiency detector used for low-energy nuclear reactions at the National Superconducting Cyclotron Laboratory. A week-long experiment using the AT-TPC collects over 10 terabytes of data. Challenges in analyzing data include simulating detector response to events, especially simulation of noisy events, and classification of reactions. Generative adversarial networks (GANs) are used to improve simulations and convolutional neural networks (CNNs) are found to classify events most successfully. Implementation methods and results for the GANs and CNNs will be presented in the context of a proton elastic scattering experiment, $^{46}\text{Ar}(p,p)$, with discussion of broader applications in nuclear physics.



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