

# Pushing Rare Event Search to the Limit with Machine Learning Algorithms

*Tuesday, May 14, 2024 11:30 AM (30 minutes)*

Rare event searches allow us to search for new physics inaccessible with other means by leveraging specialized radiation detectors. Machine learning provides a new tool to maximize the information provided by these detectors. The information is sparse, which forces these algorithms to start from the lowest level data and design customized models to produce results. The focus of this seminar will be on two main areas within rare event search experiments: neutrinoless double beta decay and dark matter. We will delve into the sophisticated mechanisms of radiation detectors that are specifically designed to detect these extraordinarily rare events. Moreover, the seminar will shed light on the development and application of specialized machine learning algorithms, integrating domain knowledge from fields such as spatiotemporal analysis, geometric deep learning, and time series analysis. In the latter part of the presentation, we will discuss the potential of next-generation AI/ML tools that are being developed to fully realize the discovery capabilities of rare event search experiments.

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**Session Classification:** Plenary: Neutrinos

**Track Classification:** Advanced Data Analysis