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Application of machine learning for anomaly detection and background discrimination in LZ data

Wednesday, May 15, 2024 5:10 PM (25 minutes)

LUX-ZEPLIN (LZ) is a dark matter direct detection experiment using a dual-phase xenon time projection chamber with a 7-ton active volume, which recently set a world leading limit for spin-independent scattering at 36 GeV/c2, rejecting cross sections above 9.2×10−48 cm2 at the 90% confidence level. Machine learning techniques have been explored at various stages of data analysis, for identifying anomalous events and background discrimination. Anomalies are expected in data, especially in the early stages of the experiment, such as from misclassification of pulses and interaction types, as well as detector pathologies. In this talk I will discuss about an unsupervised dimensional reduction approach that can effectively identify anomalous events in early LZ data. Additionally, I will present on application of machine learning tools in LZ analysis to discriminate problematic backgrounds.

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