Anomaly Finding in the LZ Dark Matter Experiment CHAMI
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Lawrence Berkeley National Laboratory — The LUX-ZEPLIN (LZ) experiment, a
10-ton dual-phase xenon dark matter experiment at the SURF laboratory in South
Dakota, is scheduled to start data collection in 2021. For a rare-event detector
such as LZ, a general-purpose anomaly finder operating in a high-dimensional fea-
ture space can help in identifying and explaining the source of unexpected events
stemming from rare backgrounds, rare signals, misclassifications, and abnormalities
in detector function. If used with existing data selection algorithms, an anomaly
finder can also increase the efficiency of identifying known backgrounds with unusual
topologies. In this presentation, we will discuss the utility of anomaly finding and
clustering to quickly identify outliers and their origins in simulated data, including
those from rare background processes and data processing irregularities. We also
discuss how to use these methods on experimental data when LZ comes online, with
potential applications to data quality and data selection for specific analyses.

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