

LUX-ZEPLIN Machine Learning

- LZ: Liquid xenon TPC, dark matter direct detection
- Machine learning example areas of interest:
 - Event reconstruction
 - Anomaly detection (rare backgrounds)
 - Pulse shape analysis
 - Speedier simulation and analysis
- Hardware/software needs:
 - NERSC fulfills most current needs
 - Work required to incorporate trained models w/in analysis
 - Future: more complex models; may train on e.g. GPUs, significant hyperparameter optimization, ...
- Training needs:
 - Familiarize people w/ existing techniques from broader ML landscape (similar experiments; accelerators; industry)
 - Some documentation, online courses, workshops exist, but this is limited, very decentralized, often hard to “translate” across domains
 - Planning a workshop for ML in dark matter direct detection / neutrino physics, DANCE-ML 2020
<https://indico.physics.lbl.gov/indico/event/DANCE ML 2020>

