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Deep Neural Networks for Energy and Position Reconstruction in EXO-200

The EXO-200 experiment searches for the neutrinoless double beta ($0\nu\beta\beta$) decay in ^{136}Xe with an ultra-low background single-phase time projection chamber (TPC) filled with 175 kg isotopically enriched liquid xenon (LXe). The detector has demonstrated good energy resolution and background rejection capabilities by simultaneously collecting scintillation light and ionization charge from the LXe and by a multi-parameter analysis. The combination of both signatures allows for complementary energy estimates and for a full 3D position reconstruction. Advances in computational performance in recent years have made novel Deep Learning techniques applicable to the physics community. This poster will briefly present the concept of the detector, summarize the work on applying Deep Learning methods for EXO-200 analyses, and evaluate the potential of Deep Learning based analysis tools towards improving the reconstruction of events in EXO-200.

Authorship annotation

for the EXO-200 Collaboration

Session and Location

Monday Session, Poster Wall #44 (Auditorium Gallery Right)

Poster included in proceedings:

yes

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Track Classification: Poster (participating in poster prize competition)