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The MicroBooNE experiment and application of deep learning to LArTPC data

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概要

MicroBooNE is a short baseline neutrino experiment situated at Fermilab. It measures neutrinos from the Booster Neutrino Beam (BNB) with a 85t Liquid Argon Time Projection Chamber (LArTPC) detector. The main scientific goals of MicroBooNE are to measure neutrino-LAr interaction cross-sections and to explore the low energy electron neutrino spectrum. Neutrino cross section measurements on LAr are an important input for the DUNE/LBNF program. Measuring low energy electron neutrinos is aimed at probing the excess of neutrino-like events observed by the MiniBooNE experiment in the [200,600] MeV region, which may hint at Beyond-Standard-Model physics.

Several low-energy excess analyses are taking place in parallel in MicroBooNE, using independent event reconstruction techniques and different signal topologies. The Deep Learning (DL) group targets 1e1p events and employs machine learning techniques to extract information used in event reconstruction.

In this talk I will present the current status of the DL low-energy excess analysis and talk about our application of machine learning to LArTPC images.

連絡教員 物理学系 久世 正弘 (内線 2080)