

Second MODE Workshop on Differentiable Programming for Experiment Design



Contribution ID: 74

Type: Poster

Reconstruction techniques for nuclear reactions measured with ACtive TARget TPC

Wednesday, September 14, 2022 7:10 PM (10 minutes)

ACTAR is an active-target TPC optimized for the study of nuclear reactions produced by low-intensity beams, such as radioactive beams. In this detector, the gas used to track charged particles within the chamber is at the same time used as a target for the incoming beam. Reconstructing the tracks left by ions is a challenging task, and two different reconstruction algorithms are compared in this work. The first is based on the RANSAC paradigm, a random and iterative routine, while the second is related to the Hough transform. These different approaches will be exposed and their performance compared, based on experimental and simulated data. In addition, results from the application of Convolutional Neural Networks to ACTAR data will be presented, focusing on both the advantages brought by this technique and the challenges still to be faced.

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Session Classification: Wine Tasting and Poster Session

Track Classification: Nuclear Physics