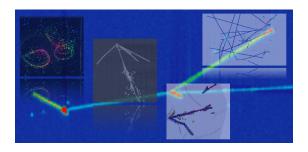
Neutrino Physics and Machine Learning (NPML 2025)



Contribution ID: 26

Type: Short talk (15min. + 5 min. Q/A)

Improving Event Reconstruction in Hyper-Kamiokande with ResNet

Monday 27 October 2025 10:55 (15 minutes)

A key goal of neutrino physics is to measure CP violation in neutrino oscillations, which may explain why the universe is dominated by matter over antimatter. The upcoming Hyper-Kamiokande experiment will be central to this effort. With a much larger detector volume and more photomultipliers than Super-K, Hyper-K will collect data at kilohertz rates. Traditional reconstruction tools are already at their computational limits, motivating new approaches. To this end, we will present our work on machine-learning-based reconstruction. We have developed an ensemble of ResNet models that improve particle momentum, position, and direction reconstruction, alongside a multi-class classifier to distinguish between key particle types. These networks achieve reconstruction and classification at speeds up to three to five orders of magnitude faster than existing techniques.

Presenter: ATTA, Andrew

Session Classification: Experiments - SK/HK