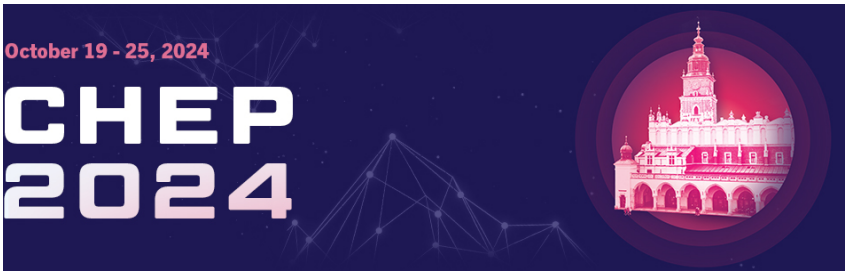

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Particle Identification Algorithms Based on Machine Learning for STCF

Tuesday 22 October 2024 16:00 (15 minutes)

The Super Tau-Charm Facility (STCF) is the new generation e^+e^- collider aimed at studying tau-charm physics. The particle identification (PID), as one of the most fundamental tools for various physics research in STCF experiment, is crucial for achieving various physics goals of STCF. In the recent decades, machine learning (ML) has emerged as a powerful alternative for particle identification in HEP experiments. ML algorithms, such as neural networks and boosted decision trees, have shown superior performance in handling complex and multi-dimensional data, making them well-suited for integrating particle identification information from multiple sub-detector systems. In this work, we present a powerful PID software based on ML techniques, including a global PID algorithm for charged particles combining information from all sub-detectors, as well as a deep CNN discriminating neutral particles based on calorimeter responses. The preliminary results show the PID models has achieved excellent PID performance, greatly boosting the physics potential of STCF.

Primary author: ZHAI, Yuncong (Shandong University)

Co-authors: Dr LI, Teng (Shandong University, CN); HUANG, Xingtao

Presenter: ZHAI, Yuncong (Shandong University)

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