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# Status of India-HK group: on ML techniques for event reconstruction with IWCD and WCTE Geometry

## Content

The machine learning (ML) technique, ResNet shows an improvement in particle identification and event reconstruction in the Intermediate Water Cherenkov Detector (IWCD) geometry over fitQun. Specifically, We studied the performance of various methods for classifying particles using receiver operating characteristics (ROC) curves and confusion matrix in IWCD geometry. The resulted area under the curve (AUC) for the ResNet model suggests enhancement in the signal efficiency for all the particles in their respective backgrounds over fitQun.

Our future prospect is implementing the above-mentioned ML techniques for particle identification and event reconstruction with Water Cherenkov Test Experiment (WCTE) and IWCD geometry. We have generated the event data with the current WCTE geometry in WCSim software at Cedar cluster. We are also extending the fitQun study to reject further $\gamma$, $\pi_0$ backgrounds hence improvizing the signal with the IWCD analysis framework.

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**Status:** ACCEPTED

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