

Recent Updates on fiTQun, a New Event Reconstruction Algorithm for Water Cherenkov Detectors

Tuesday 15 January 2013 14:10 (25 minutes)

fiTQun is a new event reconstruction algorithm which has been developed for the Super-K detector. Using the charge and time information from the photomultiplier tubes in the detector, a likelihood function is constructed, which is then maximized to extract particle track parameters. The new algorithm has the potential to substantially improve particle identification performance as well as vertex and momentum resolutions compared to the existing Super-K reconstruction algorithm. Furthermore, the framework is naturally extendable to complex event topologies that are relevant to atmospheric neutrinos and proton decay. In this talk, an overview on the recent improvements of the fitter, its latest performance, and initial results of validation studies using Super-K controlled samples will be presented. The modularized nature of the new algorithm allows us to adopt the framework to Hyper-K, and the status and our plans for the implementation will also be discussed.

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Session Classification: Softwares

Track Classification: Software