Contribution ID: **19** Type: **not specified**

A New Method for Event Reconstruction in Large Cherenkov Detectors

Tuesday 12 November 2013 17:40 (20 minutes)

In large Cherenkov detector instrumented with large photomultiplier tubes (PMTs), such as Super-Kamiokande, SNO, MiniBooNE, and Ice Cube, all information about a given set of final state particles is encoded in a single charge and time measurement for each PMT. This new reconstruction algorithm, based on the method used by MiniBooNE (NIM A608, 206 (2009)), uses a likelihood function in which predicted time and charge probability density functions are calculated for each PMT for a given choice of particle track parameters. The particle light emission profiles, water and tank properties, and the response of the electronics are all treated separately, which makes it straightforward to incorporate any Cherenkov-emitting particle hypothesis, extend the algorithm to many different detector geometries, and reconstruct multi-particle final states within a common likelihood fit framework. This algorithm has been implement for the Super-KamiokaNDE detector, and improvements over the previous algorithm, including improved detection of low energy photon rings and the first ever separation of muons from charge pions, will be presented. In addition, possible applications to future CP violation and proton decay measurements will be discussed.

Primary author: Dr WILKING, Michael (TRIUMF)

Presenter: Dr WILKING, Michael (TRIUMF)

Session Classification: Future Water Cherenkov Detectors

Track Classification: Contributed talk