A New Event Reconstruction Algorithm for Super-Kamiokande Water Cherenkov Detector SHIMPEI TOBAYAMA, University of British Columbia — Super-Kamiokande is the world's largest water Cherenkov particle detector located underground in Kamioka-mine, Gifu, Japan. The detector has been used for proton decay search, and observation of atmospheric, solar and supernova neutrinos. It also serves as the far detector for T2K long baseline neutrino oscillation experiment. The detector consists of a cylindrical tank filled with 50kt of ultra-pure water, and an array of 11,000 photomultiplier tubes (PMT) installed on the tank's inner wall record the time and intensity of the Cherenkov light emitted by charged particles traveling in the water. Using the information from the PMTs, particle type, interaction vertex, direction and momentum can be reconstructed. A new reconstruction algorithm is being developed which performs a simultaneous maximum likelihood determination of such parameters. Through Monte Carlo studies, it was found that the new algorithm has a significantly better particle identification performance and vertex/momentum resolutions, compared to the existing reconstruction software. In this talk, an outline of the new algorithm, its performance and implications on physics analyses will be presented.

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