Contribution ID: **336**   Type: **Poster**

Solar neutrino results from Super-Kamiokande

Super-Kamiokande currently continues data taking as the fourth phase of the experiment (SK-IV), but high quality 8B solar neutrino data has been accumulated since August 2006 when SK resumed operations as the third phase of the experiment (SK-III). In this presentation, new results of the solar neutrino measurement of SK-III and status/prospects of SK-IV are reported.

The global analysis of solar neutrino experiments established the Large Mixing Angle (LMA) solution with a high confidence level. In order to examine the shape (and search for a possible low energy distortion due to LMA oscillations) of the 8B solar neutrino energy spectrum in SK, larger statistics with lowered analysis threshold and smaller systematic uncertainty are necessary.

In SK-III, due to a water purification system upgrade and water flow tuning in the SK tank, the background level was lowered. Furthermore, with improved detector calibrations, a full detector simulation, and new analysis methods, the systematic uncertainty on the total neutrino flux is estimated to be 2.1%, which is about two thirds of the systematic uncertainty during the first phase of Super-Kamiokande (SK-I). These improvements have allowed SK-III to derive solar neutrino results in the 4.5-5.0 MeV energy region.

In SK-IV, additional water flow tuning has been conducted and the low-background volume in the SK tank has been enlarged. As a result, it is expected that SK-IV has sufficient sensitivity for a 2-3\sigma level discovery of the LMA-induced spectral distortions within several years of operation.

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Track Classification: 07 - Neutrinos