

High Energy Physics - Experiment

Atmospheric neutrino oscillation analysis with sub-leading effects in Super-Kamiokande I, II, and III

Super-Kamiokande Collaboration: R. Wendell, C. Ishihara, K. Abe, Y. Hayato, T. Iida, M. Ikeda, K. Iyogi, J. Kameda, K. Kobayashi, Y. Koshio, Y. Kozuma, M. Miura, S. Moriyama, M. Nakahata, S. Nakayama, Y. Obayashi, H. Ogawa, H. Sekiya, M. Shiozawa, Y. Suzuki, A. Takeda, Y. Takenaga, Y. Takeuchi, K. Ueno, K. Ueshima, H. Watanabe, S. Yamada, T. Yokozawa, S. Hazama, H. Kaji, T. Kajita, K. Kaneyuki, T. McLachlan, K. Okumura, Y. Shimizu, N. Tanimoto, M.R. Vagins, F. Dufour, E. Kearns, M. Litos, J.L. Raaf, J.L. Stone, L.R. Sulak, W. Wang, M. Goldhaber, K. Bays, D. Casper, J.P. Cravens, W.R. Kropp, S. Mine, C. Regis, M.B. Smy, H.W. Sobel, K.S. Ganezer, J. Hill, W.E. Keig, J.S. Jang, J.Y. Kim, I.T. Lim, J. Albert, M. Fechner, K. Scholberg, C.W. Walter, S. Tasaka, J.G. Learned, S. Matsuno, Y. Watanabe, et al. (52 additional authors not shown) You must enable JavaScript to view entire author list.

(Submitted on 18 Feb 2010)

We present a search for non-zero θ_{13} and deviations of $\sin^2 \theta_{23}$ from 0.5 in the oscillations of atmospheric neutrino data of Super-Kamiokande -I, -II, and -III. No distortions of the neutrino flux consistent with non-zero θ_{13} are found and both neutrino mass hierarchy hypotheses are in agreement with the data. The data are best fit at $\Delta m^2 = 2.1 \times 10^{-3} \text{ eV}^2$, $\sin^2 \theta_{13} = 0.0$, and $\sin^2 \theta_{23} = 0.5$. In the normal (inverted) hierarchy θ_{13} and Δm^2 are constrained at the one-dimensional 90% C.L. to $\sin^2 \theta_{13} < 0.04$ (0.09) and 1.9 (1.7) $\times 10^{-3} < \Delta m^2 < 2.6$ (2.7) $\times 10^{-3} \text{ eV}^2$. The atmospheric mixing angle is within $0.407 \leq \sin^2 \theta_{23} \leq 0.583$ at 90% C.L.

Comments: 17 Pages, 14 figures. To be submitted to Phys. Rev. D

Subjects: **High Energy Physics - Experiment (hep-ex)**

Cite as: [arXiv:1002.3471v1](https://arxiv.org/abs/1002.3471v1) [hep-ex]

Submission history

From: Roger Wendell [[view email](#)]

[v1] Thu, 18 Feb 2010 10:14:06 GMT (228kb,D)

[Which authors of this paper are endorsers?](#)

Download:

- [PDF](#)
- [Other formats](#)

Current browse context:

hep-ex

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1002](#)

References & Citations

- [SLAC-SPIRES HEP](#)
(refers to | cited by)
- [CiteBase](#)

Bookmark([what is this?](#))



