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Search for Supernova Neutrino Burst at Super-Kamiokande

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Abstract content

A search for supernova neutrino bursts was conducted using data from the Super-Kamiokande (SK) detector. SK detector is an imaging water Cherenkov detector containing 50,000 tons of pure water with 22,500 tons of fiducial volume, and it is sensitive to core-collapse supernova explosions via observation of their neutrino emissions. The expected number of events comprising such a burst is about 8000 in the case of a supernova explosion at the typical distance in our galaxy (10kpc); this large signal means that the detection efficiency anywhere within our galaxy and well past the Magellanic Clouds is 100%. We examined a data set corresponding to 2589.2 live days which was taken from 31st of May, 1996 to the 15th of July, 2001, and from the 24th of December, 2002, to the 5th of October, 2005. However, there is no evidence of such a supernova explosion during the data-taking period. The 90% C.L. upper limit on the rate of supernova explosions out to distances of 100 kiloparsecs is found to be 0.32 SN/year.

If this papers is presented for a collaboration, please specify the collaboration

Super-Kamiokande

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olive, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 5 (HE part 2), pages 1397-1400

Primary author(s) : Mr. IKEDA, Motoyasu (Okayama University)

Co-author(s) : Dr. TAKEDA, Atushi (ICRR, University of Tokyo)

Presenter(s) : Mr. IKEDA, Motoyasu (Okayama University)

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