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Search for n - \bar{n} Oscillation in Super-Kamiokande I

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Abstract content

A search for neutron-antineutron oscillation, a $|\Delta B| = 2$ process predicted by L-R symmetric gauge theories, was undertaken using the 24.5×10^{33} neutron-years of exposure in run one of Super-Kamiokande. When incorporating most major sources of systematic and statistical errors we calculate the upper limit on the oscillation lifetime of neutrons in oxygen to be 1.78×10^{32} years at the 90% confidence level. Using the theoretical suppression factor $R=3.6 \times 10^{23} \text{ sec}^{-1}$, this result is equivalent to the free neutron oscillation limit of 1.25×10^8 seconds compared with $.87 \times 10^8$ seconds obtained in the free neutron experiment at Grenoble (1994). For the purpose of comparison with previous intranuclear experiments, our upper limit without the inclusion of systematic errors was found to be 3.20×10^{32} years. This is an improvement by a factor of 7.4 over the previous best measurement in oxygen by Kamiokande (1986) and 4.4 over the best measurement in iron by Soudan (2002).

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'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 4 (HE part 1), pages 791-794

Primary author(s) : Prof. GANEZER, Kenneth (California State University, Dominguez Hills); Dr. JANG, JeeSeung (Chonnam, Korea); Dr. KAMEDA, Jun (ICRR University of Tokyo)

Presenter(s) : Prof. GANEZER, Kenneth (California State University, Dominguez Hills)

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