

Status of the Sudbury Neutrino Observatory

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The Sudbury Neutrino Observatory

Abstract

The solar neutrino problem, as revealed by 5 different experiments over the last 30 years, relates to the significant disagreement between the predicted and observed flux of neutrinos generated by nuclear processes in the sun. The leading explanation for this phenomenon is that the neutrinos themselves are changing flavours as they travel from the sun via an oscillation mechanism which could result if neutrinos have a small amount of mass. The study of this problem therefore addresses fundamental aspects of both the standard solar model and the standard model of particle physics. The Sudbury Neutrino Observatory (SNO) is a joint Canadian, US and UK experiment designed to provide an unambiguous solution to the long-standing solar neutrino problem. The unique capability to do this is afforded by the use of 1000 metric tons of heavy water, which allows both neutral and charged current interaction rates to be observed. The former of these is sensitive to all flavours of neutrinos, whereas the latter is only sensitive to electron-type neutrinos. The ratio of these rates will thus provide a definitive, model-independent test of the oscillation hypothesis. After several years of considerable effort, SNO began taking data on April 30, 1999. By the time of the ICRC, we will thus have taken roughly 4 months of data. A report on initial detector calibrations, detector performance and the general state of the experiment will be presented.