# Search for Solar hep Neutrinos in the Sudbury Neutrino Observatory

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The Sudbury Neutrino Observatory (SNO) is designed to measure the flux of solar neutrinos and to determine the shape of the solar neutrino spectrum. Neutrinos from the beta-decay of $^8$B dominate the solar neutrino spectrum between 5-15 MeV. The shape of the neutrino energy spectrum from a single beta-decaying source is well known and independent of solar physics to an accuracy of 1 part in $10^6$. A measurement of the shape of the solar neutrino energy spectrum is a direct test of the minimal electroweak model and can be used to constrain models of neutrino flavor transformation.
Near the $^8$B endpoint the solar neutrino spectrum is very sensitive to any underlying background, including neutrinos with energies above 15 MeV from other sources than $^8$B-decay. In a rare branch of the pp-chain in the Sun, $^3$He and proton fuse forming the reaction $^3He + p \rightarrow ^4 He + e^+ + \nu_e$. This *hep* process produces the highest energy solar neutrinos with an energy of up to 18.77 MeV.
Standard Solar Model calculations predict a *hep* neutrino flux three orders of magnitude smaller than the flux of $^8$B neutrinos. Although the *hep* neutrino flux is a negligible contribution to the total neutrino flux measured in SNO it can significantly distort the $^8$B neutrino spectrum near the endpoint if the *hep* S-factor is much larger than the existing estimates. The reliable estimation of the *hep* cross-section has been a long-standing challenge in nuclear physics and a direct measurement of the flux of *hep* neutrinos has not been done.
SNO recently determined the energy spectrum of solar neutrinos from the measurement of the electron spectrum in the process $\nu_e + d \rightarrow e^- + p + p$ above a kinetic energy of 5 MeV. The SNO solar neutrino spectrum is now analyzed for the contribution from solar *hep* neutrinos. We report on the status of the search for solar *hep* neutrinos in the Sudbury Neutrino Observatory.