Terrestrial 40K geoneutrinos and Solar CNO neutrinos

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Value of the Earth thermal flux is estimated through temperature gradient method (47 TW). There are exist other ways of heat transfer to the Earth surface from inside, so total heat flux is unknown yet. Non-direct measurements establish Earth thermal flux on the level 200-300 TW. To produce so high flux one needs to add heat produced by 40K to the known isotopes 238U and 232Th. Exact value of potassium in the Earth is unknown. To estimate its content we need to measure 40K antineutrino flux on the surface of the Earth. The problem that solar neutrino fluxes from CNO cycle look very similar to 40K flux. It is needed independent experiment on measuring solar CNO neutrinos to distinguish between 40K and CNO fluxes in a large scintillation detector (e.g. Borexino). We propose to use 115In as a target (R. Raghavan's idea) for solar CNO neutrinos. New type of a detector proposed.

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Effect of the overburden on the geoneutrino signal at SNO+

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The SNO+ detector is designed to achieve several fundamental physics goals as a low-background experiment, particularly measuring the Earth's geoneutrino flux. The detector is located at SNOLAB, one of the deepest underground laboratories in the world with an overburden of 2092 m. The goeneutrino signal from originated from the 50 × 50 km upper crust surrounding the detector is estimated adopting a refined 3D model and a full calculation of survival probability. Specifically, the effect of the 2 km overburden on the predicted crustal geoneutrino signal at SNO+ is evaluated. A signal difference corresponding to the ~5% of the total crustal contribution, is found comparting this signal with that obtained by placing SNO+ at sea level.

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Global Crustal Thickness and Velocity Structure From Geostatistical Analysis of Seismic Data

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