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Baksan Experiment on Sterile Transitions

A neutrino deficit is observed in radio-chemical solar neutrino experiments GALLEX and SAGE in measurements with radioactive sources. This result can be explained by neutrino transitions to a hypothetical sterile state on a short baseline, corresponding to the squared mass difference of the order of 1 eV^2 . A new underground experiment to search for this type of neutrino transition is planned to be carried out at the Baksan Neutrino Observatory on the Gallium-Germanium Neutrino Telescope, which has been used in the solar neutrino experiment SAGE. The idea is to observe the neutrino capture rate at two distances from the source. A Ga target is divided in two concentric zones in a way that the neutrino path lengths in each zone are equal. A statistically significant difference of the neutrino capture rate in these zones, as well as a considerable deficiency of the average rate in both zones in comparison with the expected rate, will indicate to the existence of the neutrino oscillation on a short baseline. The key features of this experiment are the intense compact neutrino source, which provides a high flux of monochromatic neutrinos, low backgrounds (including solar neutrinos), and a well established during decades technique of neutrino detection. The experiment allows to put constraints on squared mass difference and mixing angle corresponding to the oscillations to the hypothetical sterile neutrinos.

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