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Solar neutrinos experiment using torsion balance with sapphire crystal

Considering only the coherence scattering of neutrinos(antineutrinos)on stiff crystals, an experiment with a torsion balance is proposed. The balance is coupled to an optical autocollimator which measures small rotation angles of about 0.1arcsec. The period of the torsion balance is about 1140s. A diurnal effect is expected for solar neutrinos, due to the rotation of the Earth around its own axis. Neutrinos interact with the torsion balance with a force between 10^{-5} and 10^{-8} dyn, comparable with that reported by J.Weber [1]. In our experiment the mass of sapphire and lead is identical (25g). The results show a very large cross section for neutrinos incident on infinitely stiff crystals.The construction and testing of this kind of high sensitivity torsion balance designed and built at the "Horia-Hulubei" National Institute for R&D in Physics and Nuclear Engineering-Bucharest are presented and discussed.

[1]Apparent observation of abnormally large coherent scattering cross section using keV and MeV range antineutrinos, and solar neutrinos, J.Weber, Physical Review D Vol.38,No.1, July 1988, pp.32-40.

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