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The search for solar hadronic axions by nuclear resonant method

Abstract

I will discuss the experimental searches for solar hadronic axions which can be emitted in magnetic transitions in nuclei of the solar core. These quasi-monoenergetic axions can be detected via a resonant absorption by the same nuclei inside (or near) the appropriate detector. This scheme of experiment was applied to stable nuclides with low-lying levels which can be thermally excited in the solar core, as well as to nuclides with high levels which can be populated in the solar nuclear reactions. All the previous experiments for resonant detection of solar hadronic axions had relatively low number of target nuclei and/or the low detection efficiency. The new experiment with a big Kr-83 proportional counter is operated in the Baksan Neutrino Observatory. The exposure in this experiment is much more than in all previous searches of such kind, and it has reached the record level of sensitivity to the mass of hadronic axions.

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