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A search for resonant absorption of solar axions by atomic nuclei

In series of works resonance excitation of the ^{83}Kr first nuclear level ($E = 9.4$ keV) by solar axions formed via the Primakoff mechanism is sought. The γ - and X-ray photons, the conversion and Auger electrons arising from the excited-level relaxation are detected with a gas proportional counter of a low-background detector in the underground Baksan Neutrino Observatory. The following experimental constraint is obtained for the product of the axion-photon coupling constant and the axion mass: $|g_{A\gamma} \times m_A| \leq 6.3 \times 10^{-7}$ and model independent upper limit on the combination of isoscalar and isovector axion-nucleon couplings $|g_3 - g_0| \leq 8.4 \times 10^{-7}$. In the framework of the hadronic-axion model, this corresponds to a new axion-mass constraint of $m_A \leq 12.7$ eV at 95% C.L.

Mini-abstract

Presented the results of searches for resonant absorption of solar axions by atomic nuclei

Experiment/Collaboration

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