

Search for resonant absorption of solar axions by ^{83}Kr nuclei

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A search for solar axions using resonant absorption by ^{83}Kr nuclei is continued with the krypton proportional counter at the Baksan Neutrino Observatory. The absorption should lead to the excitation of lower nuclear energy level of ^{83}Kr : $A + ^{83}\text{Kr} \rightarrow ^{83}\text{Kr}^* \rightarrow ^{83}\text{Kr} + \gamma$ (8.41keV). The obtained model independent upper limit on the combination of isoscalar and isovector axion-nucleon couplings $|g_3 - g_0| \leq 8.4 \times 10^{-7}$ allows to set a new upper limit on the hadronic (KSVZ) axion mass of $m_A \leq 65$ eV (95% C.L.) with the generally accepted values $S=0.5$ and $z=0.56$. The resonant absorption of the Primakoff solar axions constrains on the axion-photon coupling and axion mass $|g_{A\gamma} \times m_A| \leq 6.3 \times 10^{-17}$ that corresponds to the upper limit on KSVZ axion mass $m_A \leq 14.3$ eV. For solar axions produced by Compton and bremsstrahlung like processes the limit on axion-electron coupling and KSVZ axion mass are $|g_{Ae} \times m_A| \leq 1.8 \times 10^{-9}$ eV and $m_A \leq 98$ eV, correspondingly (all at 95% C.L.).

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