

Probing the eV-mass range for solar axions with the CAST experiment

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The CERN Axion Solar Telescope (CAST) is searching for solar axions, which could be produced in the core of the Sun via the so-called Primakoff effect. For this purpose, CAST uses a decommissioned LHC prototype magnet. In its magnetic field of 9 Tesla axions could be reconverted into X-ray photons. The magnet is mounted on a structure built to follow the Sun during sunrise and sunset for a total of about 3 hours per day. The analysis of the data acquired during the first phase of the experiment with vacuum in the magnetic field region yielded the most restrictive experimental upper limit on the axion-to-photon coupling constant for axion masses up to about 0.02 eV. In order to extend the sensitivity of the experiment to a wider mass range, the CAST experiment continued its search for axions with helium in the magnet bores. In this way it is possible to restore coherence for larger masses. Changing the pressure of the helium gas enables the experiment to scan different axion masses. In the first part of this second phase of CAST, helium-4 has been used and the axion mass region was extended up to 0.4 eV. Therefore the experiment enters the regions favored by axion models. In CAST's ongoing helium-3 phase the studied mass range is now further extended. We will present the final results of CAST's helium-4 phase. Furthermore the latest upgrades of the experiments will be shown and an outlook on CAST's status and prospects will be given.

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