

Searches of Axion/ALPs with (Baby)IAXO

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The International Axion Observatory (IAXO) is a new generation axion helioscope aiming at a sensitivity to the axion-photon coupling $g_{a\gamma}$ down to $10^{-12} \text{ GeV}^{-1}$, i.e. 1-1.5 orders of magnitude beyond CAST, the most sensitive axion helioscope to date. The main elements of IAXO are a large superconducting toroidal magnet with eight bores, x-ray focusing optics and low background detectors. An intermediate helioscope on the way to IAXO, called BabyIAXO, with the aim of testing the new technologies for the full scale experiment and also test un-explored region of the axion parameter space, is under construction at DESY. Several components of the experiment are reaching the final stage of development. We will discuss the strategy to perform important tests in the final BabyIAXO location at DESY on different instrumentation and mechanics in preparation to BabyIAXO while waiting for the magnet to be in place. Once completed, BabyIAXO will be able to test $g_{a\gamma}$ down to $2 \times 10^{-11} \text{ GeV}^{-1}$. Already with babyIAXO it will be possible to search for evidence of axion-electron and axion-nucleon coupling in the Sun. Moreover, installing cavities or antennas in the magnet bores will turn BabyIAXO into an axion haloscope, sensitive to dark matter axions in different mass ranges. We will discuss the physics reach of BabyIAXO and present the enhanced sensitivity for axion discovery which will be possible to obtain with the full scale IAXO.

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