

Preliminary results for DFSZ axion definitive searches at IBS-CAPP

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The CAPP-12TB experiment is a microwave cavity search for dark matter axions at IBS-CAPP in KAIST. The system consists of a superconducting solenoid with a bore size of 320 mm and a maximum field of 12 T at the magnet center, a cryogenic dilution fridge with physical temperatures around 30 mK with the cavity load, and a nearly quantum-limited noise Josephson parametric amplifier. The copper cavity has a large volume (37 L) and an unloaded Q-factor around 100,000 along its frequency range tuned by a copper rod. We report the first preliminary results of the experiment which excludes the Dine-Fischler-Srednicki-Zhitnitskii (DFSZ) axion model for the mass range $4.51 \mu\text{eV}$ (1.09 GHz) to $4.59 \mu\text{eV}$ (1.11 GHz) at a 90% confidence level. The CAPP-12TB experiment will continue its search for DFSZ axions over a wider range of axion masses.

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