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DFSZ axion definitive searches at IBS/CAPP

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The CAPP-12TB experiment is a resonant microwave cavity axion search at IBS/CAPP in KAIST for the axion mass range 3.3 - 12.4 μeV. All parts of the system are currently being integrated to begin the first phase of the experiment. The system consists of a superconducting solenoid with a bore size of 320 mm that has been tested to reach a maximum field of 12 T, a cryogenic dilution fridge with physical temperatures around 50 mK with the cavity load, and a nearly quantum-limited noise Josephson parametric amplifier. The copper cavity has a large volume (30 L) and a measured Q-factor above a hundred thousand along most of its frequency range tuned by a copper rod. An asymmetric design is introduced in order to resolve the issue of so-called mode mixings - mixture of the desired resonant mode with unwanted modes during the frequency tuning process. The experiment expects to explore the mass range with sensitivity beyond the DFSZ level within a few years.

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