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Searches for high frequency axions at IBS/CAPP

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Multiple-cell cavities were designed by IBS/CAPP to access high frequency regions while maximally utilizing the volume of a given solenoid for cavity haloscopes. We conducted the first multiple-cell haloscope experiment, CAPP-9T MC, using a double-cell cavity mounted in JANIS He-3 cryogenic system equipped with a 9T superconducting magnet. We obtained a new limit for $g_{a\gamma\gamma}$ that is about 5 times better than the previous limit over the axion mass range between $13 \mu\text{eV}$ and $13.9 \mu\text{eV}$ from data acquired for about 19 days. The experiment has successfully demonstrated that this unique cavity design is capable of exploring high frequency regions more efficiently. IBS-CAPP plans to install quad-cell, sext-cell, and octa-cell cavities to search for axions at even higher frequencies in the near future.

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