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CULTASK: The first axion search experiment in Korea

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CAPP's axion searching experiment named as CULTASK (CAPP's Ultra Low Temperature Axion Search in Korea) adopts P. Sikivies's axion haloscope that uses strong magnetic field applied high Q factor of microwave cavity. We have started the first CULTASK experiment at 10.3μeV mass region and we demonstrate the progress and prospect. The dilution refrigerator (Bluefors LD 400 series) with 8T superconducting magnet is fully equipped and it successfully cools the cavity down to 30mK or less even with all the heavy supporting jigs and electronic components such as piezo actuators. We especially use vertically split cavity that promises to solve contact problem of TM010 mode in cylindrical cavity. The resonance frequency is tunable within 2.1GHz to 2.5GHz by perturbing the field with high permeability of dielectric rod; (CULTASK uses 99.99% sapphire), which is driven by a rotational piezo. The unloaded Q factor measurement is more than 50,000 when the cavity is in cryogenic condition. SQUID amplifier test results will be shown either, which would be used in next run.

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