

Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Microwave cavity with dielectric material in CAPP's axion search experiment JINSU KIM, KAIST, IBS, OHJOON KWON, WOOHYUN CHUNG, IBS, YANNIS K. SEMERTZIDIS, IBS, KAIST — The Center for Axion and Precision Physics Research (CAPP) of IBS in Korea is launching a microwave axion search experiment using a high Q-factor, tunable resonant cavity submerged in a strong magnetic field. We are currently searching for axions in the 1.5 to 2.5 GHz (TM010 mode) frequency range, but would like to extend the mass range of search in the future without suffering a volume loss. In order to access high frequencies without much degrading the axion to photon conversion power and the scanning rate of the experiment, a new type of cavity with loss-free dielectric material (sapphire) inside is proposed. With proper geometry of dielectric material, it is possible to create higher modes with larger form factors. The results of various simulation studies and test on this type of resonator using the TM030-like mode will be presented.

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Date submitted: 12 Jan 2018

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