

# Axion haloscopes with toroidal geometry at CAPP/IBS

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The present state of the art axion haloscope employs a cylindrical resonant cavity in a solenoidal field. We, the Center for Axion and Precision Physics research (CAPP) of the Institute for Basic Science (IBS) in Korea, are also pursuing halo axion discovery using this cylindrical geometry. The presence of end caps of cavities increases challenges as we explore higher frequency regions for the axion at above 2 GHz. To overcome these challenges we exploit a toroidal design of cavity and magnetic field. A toroidal geometry offers several advantages, two of which are a larger volume for a given space and greatly reduced fringe fields which interfere with our preamps, in particular the planned quantum based versions. We introduce to a concept of toroidal axion haloscopes and present ongoing research activities and plans at CAPP/IBS.

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