Contribution ID: **7** Type: **not specified**

Axion Haloscopes with Toroidal Geometry

Wednesday, 11 January 2017 15:10 (35 minutes)

The axion power in a resonant cavity is proportional to B^2V. The radius of cylindrical cavity decreases linearly with increasing frequency thus decreasing the volume as the square of the frequency increase. Attempting to recover the volume, and thus a reasonable axion power, one can increase the length of the cavity. This quickly leads to mode crossings and potential mode localizations due to fabrication errors. To address these issues we have decided to explore a toroidal geometry for an axion haloscope. The toroid dispenses with endcaps so the primary B field does not encounter any perpendicular surfaces, making it an attractive design for superconducting film application. In our first phase of R&D we have designed and fabricated a small, 140mm diameter, toroid and explored its resonant behavior with and without a tuning system. We have also installed a toroidal solenoid and taken data in the 25-33 μeV range. I will present our experiences with our "Cappuccino Sub" and some future plans.

Primary author: Dr THEMANN, Harry (Center for Axion and Precision Physics)

Presenter: Dr THEMANN, Harry (Center for Axion and Precision Physics)