Contribution ID: **65** Type: **Regular talk**

The Plasma Axion Haloscope and the ALPHA Collaboration

Tuesday 23 November 2021 12:00 (15 minutes)

The plasma haloscope is a novel method for the detection of the resonant conversion of axions to photons. Traditional cavity haloscopes compensate for the momentum mismatch between the axion and the massless photon by breaking translational invariance, for instance through implementing physical structures on the order of the axion Compton wavelength. This makes reaching higher axion masses a challenge due to the very small structures needed. Plasma haloscopes instead use a tunable plasma frequency to match the axion mass. Using a wire metamaterial plasma haloscope, the plasma frequency can be tuned to match the axion mass by changing the interwire spacing, allowing for large conversion volumes.

The newly formed ALPHA collaboration has begun work towards building a tunable, cryogenic, plasma haloscope. A wire metamaterial has been chosen as the target plasma, and is expected to reach competitive sensitivity for axion masses between $8-400$ μeV. This talk will give an overview of the plasma haloscope concept and the ongoing experimental effort of the ALPHA collaboration.

Author: DUNNE, Katherine (Stockholm University (SE))

Presenter: DUNNE, Katherine (Stockholm University (SE))

Session Classification: Tuesday morning session 2