



THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics
SEMINAR

Axion Wind Detection with the Homogeneous Precession Domain of Superfluid Helium-3

by



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ALL INTERESTED ARE WELCOME

Abstract

Axions and axion-like particles may couple to nuclear spins like a weak oscillating effective magnetic field. Existing proposals for detecting this "axion wind" sourced by dark matter exploit analogies to nuclear magnetic resonance (NMR) and aim to detect the small transverse field generated when the axion wind resonantly tips the precessing spins in a polarized sample of material. In this talk, I will describe a new proposal using the homogeneous precession domain of superfluid He-3 as the detection medium, where the effect of the axion wind is a small shift in the precession frequency of a large-amplitude NMR signal. This setup can provide broadband detection of multiple axion masses simultaneously, and has competitive sensitivity to other axion wind experiments such as CASPER-Wind at masses below 0.1 micro-eV by exploiting precision frequency metrology in the readout stage.