Contribution ID: **63** Type: **Talk**

WISP Searches on a Fiber Interferometer under a Strong Magnetic Field

Friday, 20 September 2024 09:20 (20 minutes)

WISPFI (WISP Searches on a Fiber Interferometer) is a novel table-top experiment designed to detect photon-axion conversion using resonant mixing. The experiment employs hollow-core photonic crystal fibers (HC-PCF) to fulfill the resonant condition, which can be precisely tuned by adjusting the gas pressure within the fiber. This technique enables the probing of an unexplored axion mass range (28 meV–100 meV) and achieves the two-photon coupling levels anticipated for the QCD axion.

The experiment is based on a partial-free space Mach-Zehnder-type interferometer that measures the photon reduction in the sensing arm, which is positioned within an external magnetic field. Two lasers at different wavelengths of 1535nm and 1570nm are used together with an optical switch to modulate the axion signal at a frequency of 100kHz. Noteworthy advancements are presented concerning the data-taking of the currently built prototype, and the outline of the next steps and future upgrades of the experiment is discussed.

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Session Classification: Morning 5