

# Exploring dark matter and quantum space-time fluctuations through precision laser interferometry

*Tuesday 4 July 2023 09:35 (35 minutes)*

In this talk, I present a novel approach based on precision laser interferometry that combines the search for axion-like particles and low-mass scalar-field dark matter with the investigation of quantum space-time fluctuations. For the dark matter search, our method employs polarimetry with a Fabry-Perot cavity in combination with high birefringence crystals to achieve unprecedented sensitivity across a wide spectrum of potential dark matter particle masses. Additionally, I will discuss our experimental efforts to test quantum space-time fluctuations, which stem from the holographic principle and aim to unify quantum field theory and general relativity. Our integrated approach represents a significant advancement in dark matter searches and quantum gravity detection, offering new insights into fundamental physics. The precision of laser interferometry plays a crucial role in enabling these novel experiments by providing state-of-the-art measurements.

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