

Quantum Enhanced Impulse Measurements with Mechanical Sensors in the Search for Dark Matter



DR. SOHITRI GHOSH
Fermilab, Batavia, Illinois, USA

Abstract

Recent advances in mechanical sensing technologies have led to the suggestion that heavy dark matter candidates around the Planck mass range could be detected through their gravitational interaction alone. With this ultimate goal on the horizon, the Windchime collaboration is involved in developing the necessary techniques, systems, and experimental apparatus using arrays of optomechanical sensors. These can also be used to investigate non-gravitational signals from other dark matter candidates in the near-term. However, to achieve Planck-scale detection, measurements of these devices will need to go beyond the standard quantum limit. Hence we need to employ quantum-enhanced readout techniques for detecting the extremely weak impulses due to the gravitational interaction of dark matter. Here we discuss the different techniques for achieving such quantum-enhanced measurements in optical and microwave domain, which would help us in reducing the measurement-added noise floor in experimentally relevant parameter regimes in order to reach our desired sensitivity.

Everyone is invited to attend

Venue

PAMU Seminar Hall
7th Floor Kolmogorov
Building, ISI

Date & Time

18th January, 2024
02:15 PM

