



Contribution ID: 172

Type: **Parallel talk**

Superfluid Optomechanics for dark matter direct detection

Wednesday 30 August 2023 17:30 (15 minutes)

The direct detection of light (sub-MeV) dark matter presents a significant challenge due to the need for very low energy thresholds. I will discuss the Optomechanical Dark-matter INstrument (ODIN), a new proposal to use a superfluid helium optomechanical cavity to search for dark matter in the keV mass range. Scattering dark matter excites a single (ueV range) phonon in the superfluid helium, which is then converted into an (eV range) photon via an optomechanical interaction with a pump laser. This photon can be efficiently detected, providing a means to sensitively probe keV scale dark matter. Optomechanical systems have demonstrated sensitivity to phonons with ueV energies, making them ideally suited to the detection of light dark matter.

Submitted on behalf of a Collaboration?

No

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Session Classification: Dark matter and its detection

Track Classification: Dark matter and its detection