



CRC 1227
Designed Quantum States of Matter



GUEST LECTURE

Assistant Prof. Dr. Swati Singh

**Department of Electrical and Computer Engineering, Material
Science and Engineering, and Physics
at the University of Delaware, US**

(Guest of Prof. P. Schmidt und Prof. K. Hammerer)

Leibniz Universität Hannover

DQ-mat Colloquium

18 April 2024, 4.00 pm

(via Zoom-Meeting)

"Searching for dark matter and dark energy with mechanical systems"

When properly engineered, simple quantum systems such as harmonic oscillators or spins can be excellent detectors of feeble forces and fields. Following a general introduction to this fast-growing area of research, I will focus on using optomechanical systems as sensors of weak acceleration and strain fields. Ultralight dark matter coupling to standard model fields and particles would produce a coherent strain or acceleration signal in an elastic solid. I will discuss the feasibility of searching for this signal using various optomechanical systems. I will also show that current mechanical systems have the sensitivity to set new constraints on scalar field candidates for dark energy. Finally, I will briefly overview the promise of quantum noise limited detectors in the search for beyond the standard model physics.

All DQ-mat members and all interested are cordially invited to attend.