Nano

The Vienna Doctoral Programme on Complex Quantum Systems
invites you to a

Seminar Talk

by

David Moore

Yale University

"Precision searches for new physics using optically levitated sensors"

New technologies building on tools developed in atomic and optical physics are enabling the control of mechanical objects in the quantum regime. Such technologies can provide extreme sensitivity to tiny forces and accelerations acting on massive objects, allowing new searches for weakly coupled interactions that could be related to dark matter, dark energy, or other new physics beyond the Standard Model. These experiments at the "precision frontier" of particle physics may give the first hints of new processes that occur at energies out of reach of direct searches at particle accelerators.

I will describe work to develop optomechanical force sensors capable of detecting sub-attonewton forces acting on optically trapped, micron-sized test masses. Such sensors can allow the detection of new forces that appear at shorter distance, or weaker coupling, than could be identified with previous techniques. I will present results to-date from using these sensors to search for dark matter particles with tiny electric charges as well as new forces that appear in certain models attempting to account for dark energy. Future development of these techniques can enable a new generation of sensitive searches for "fifth" forces that could arise from physics beyond the Standard Model.

Monday, 14 October 2019,
16:30h get-together with coffee and snacks!

Lise Meitner Hörsaal, Strudlhofgasse 4, 1st floor, Vienna

The seminar talk will be preceded by a CoQuS Student talk at 17:00h
by

Jakob Hinney

TU Wiien

"Observation of Squeezed Light from an Ensemble of Weakly Coupled Emitters"

Hosted by: Markus Aspelmeyer