IST AUSTRIA
Institute of Science and Technology

Physical Sciences Seminar

Cavity optomechanics implemented using levitated superconductors and Josephson microwave circuits

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Host: Johannes Fink

Experimental investigation of quantum mechanics with heavy objects (e.g. above Planck mass, ~20µg) has not been achieved yet, as it requires the challenging combination of decoupling the quantum object from environmental influences, while at the same time remaining high control of it.

In a first step, optically levitated objects have been implemented due to their intrinsic decoupling and the outstanding ability to design their quantum wavefunction. Among many experimental breakthroughs quantum ground state cooling has recently been achieved. However, the optical trapping requires high drive powers reheating the mechanical element. Moreover, the utilized masses are around some femtogram, and so orders of magnitude smaller than the desired microgram.

To overcome restrictions in optical systems we implemented the approach of superconducting microspheres in a magnetic field trap, allowing for a mass independent levitation. To reach sufficiently high coupling rates we employ inductively coupled quantum circuits acting as optical cavity.

In my talk I will introduce the envisioned platform, present recent progress and discuss the requirements of the superconducting microwave circuits, currently in fabrication at IST.

Tuesday, March 16, 2021 11:00am - 12:00pm

IST Austria Campus ONLINE via Zoom

This invitation is valid as a ticket for the IST Shuttle from and to Heiligenstadt Station. Please find a schedule of the IST Shuttle on our webpage: https://ist.ac.at/en/campus/how-to-get-here/ The IST Shuttle bus is marked IST Shuttle (#142) and has the Institute Logo printed on the side.