



## Physical Sciences Seminar

# Ultracoherent Mechanical Resonators for Quantum Optomechanics

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**Host: Onur Hosten**

Mechanical dissipation plays a key role in the field of quantum optomechanics. Not only does dissipation fundamentally limit the coherence time of mechanical quantum states; it also sets the thermomechanical noise floor limiting state-of-the-art force sensing technologies. While significant efforts have been devoted to increase optomechanical coupling rates by working with nanoscale mechanical resonators with low effective mass, mechanical dissipation usually increases with decreased size. However, due to a phenomenon known as dissipation dilution, high quality factors can be achieved even at the nanoscale. In this talk, I will describe techniques which reduce mechanical dissipation and effective mass and how these techniques were exploited to produce the highest quality factors to date at room temperature: 800 million in Si<sub>3</sub>N<sub>4</sub> nanobeams. I will then discuss our efforts to integrate these resonators in optomechanical systems with extremely high coupling rates.

**Tuesday, November 12, 2019 11:00am - 12:00pm**

IST Austria Campus Heinzl Seminar Room / Office Bldg West (I21.EG.101)



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.