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 floorlimiting 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 Si3N4 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
Heinzel Seminar Room / Office Bldg West (I21.EG.101)

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