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【513】Ultra coherent nanomechanical oscillators

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Mechanical oscillators have a rich history and role in precision science, ranging from the atomic force microscope, gravitational wave detection to technology such as filters in cell phone or quartz oscillators. The dissipation of the mechanical oscillator plays a key role in setting the thermal decoherence rate, limiting e.g. the ability to observe radiation pressure quantum effects, or placing a limit on force sensitivity. In recent years advances in material strain engineering, phononic band-structure engineering and nanofabrication have allow to create mechanical oscillators with unprecedented coherence. In this talk these advances are reviewed which enable mechanical oscillators with room temperature quality factors as high as 1 billion, sufficient for room temperature ground state cooling of a macroscopic mechanical oscillator.

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