Abstract Submitted
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Sympathetic cooling of nanospheres with cold atoms[1] CRIS MONTOYA, APRYL WITHERSPOON, GAMBHIR RANJIT, KIRSTEN CASEY, University of Nevada, Reno, JOHN KITCHING, National Institute of Standards and Technology, ANDREW GERACI, University of Nevada, Reno — Ground state cooling of mesoscopic mechanical structures could enable new hybrid quantum systems where mechanical oscillators act as transducers. Such systems could provide coupling between photons, spins and charges via phonons. It has recently been shown theoretically that optically trapped dielectric nanospheres could reach the ground state via sympathetic cooling with trapped cold atoms [1]. This technique can be beneficial in cases where cryogenic operation of the oscillator is not practical. We describe experimental advances towards coupling an optically levitated dielectric nanosphere to a gas of cold Rubidium atoms. The sphere and the cold atoms are in separate vacuum chambers and are coupled using a one-dimensional optical lattice.
[1] G. Ranjit, C. Montoya, A. A. Geraci, Phys Rev. A 91, 013416 (2015).

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Cris Montoya Monge
Univ of Nevada - Reno

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