Abstract Submitted
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Sympathetic Cooling of Levitated Nanospheres using Cold Atoms[1] WILLIAM EOM, EDUARDO ALEJANDRO, DANIEL GRASS, Northwestern University, APRYL WITHERSPOON, University of Nevada, Reno, CRIS MONTOYA, Northwestern University, GAMBHIR RANJIT, Microsoft, ANDREW GERACI[2], Northwestern University — Trapped silica nanospheres cooled to the ground state of their center of mass motion can be used to explore the interface between the quantum and classical world in search of new physics. Rubidium atoms are stored in a MOT, while a lone silica nanosphere is trapped in a separate chamber with optical tweezers. The systems are then coupled through radiation pressure forces mediated by a 1-D optical lattice for sympathetic cooling. The atoms, cooled with well-known techniques such as molasses cooling, can sympathetically reduce the center of mass motion of the trapped sphere. Such cooled spheres can be used for precision sensing, matter-wave interferometry, and tests of quantum coherence in the mesoscopic regime.

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