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Ultrasensitive Force sensing with optically levitated nanoparticles EVAN WEISMAN, CHETHN GALLA, Northwestern University, GHAMBIR RANJIT, None, CRIS MONTOYA, Northwestern University — Optically levitated and cooled dielectric particles in high vacuum are a promising tool for use in precision experiments. Since they are decoupled mechanically from the environment optically levitated particles can have very high-quality factors enabling ultrasensitive force detection. We describe progress on an experiment using silica nanospheres trapped in an optical lattice to search for deviations from Newton's inverse square law at the micron scale where we have achieved zeptonewton force sensitivity. Recent modifications to the experiment include a fiber-based dipole trap and solid invar cavity.

Evan Weisman
Northwestern University

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