

Abstract Submitted  
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**Tests of Gravity Below the 50-micron Distance Scale**<sup>1</sup> DAVID SMITH<sup>2</sup>, C.D. HOYLE, HOLLY LEOPARDI<sup>3</sup>, Humboldt State University — Though it is the oldest recognized of the fundamental forces, tests of gravity remain at the forefront of experimental physics research. Due to the incompatibility of the Standard Model and General Relativity, there is no accepted Unified Field Theory, though some attempts to construct such a model via String Theory predict more than three spatial dimensions that could alter the gravitational Inverse-Square Law at short distances. Certain scenarios also predict unobserved subatomic particles that may cause short-range violations of the Weak Equivalence Principle. The Gravitational Research Laboratory at Humboldt State University, a collaboration of undergraduate students and faculty, is developing an experiment that will test gravitational interactions below the 50-micron distance scale. The experiment will measure the torque applied to a torsion pendulum as an attractor mass is oscillated nearby. The size and distance dependence of the torque variation will provide a means to determine any deviations from Newtonian gravity at heretofore untested scales. The major components of the experiment have been designed and fabricated including a novel stepped parallel-plate torsion pendulum and a high-precision optical angle detection system. This talk will provide a general overview of the experiment and focus primarily on current status and expected outcomes.

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