

Abstract Submitted  
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**Novel Tests of Gravity at the Sub-millimeter Scale**<sup>1</sup> JEREMY JOHNSON<sup>2</sup>, IAN GUERRERO<sup>3</sup>, GABRIELA MARTINEZ<sup>4</sup>, C.D. HOYLE, Humboldt State University — Theories which attempt to unify the Standard Model and General Relativity often include features which violate the Weak Equivalence Principle (WEP) and gravitational Inverse-Square Law (ISL). A violation of either the WEP or ISL at any length scale would bring into question our fundamental understanding of gravity. Motivated by these considerations, undergraduates and faculty at Humboldt State University are building an experiment to probe gravitational interactions below the 50-micron length scale. The experiment employs a torsion pendulum with equal masses of different material arranged as a “composition dipole.” We measure the twist of the torsion pendulum as an attractor mass is oscillated nearby in a parallel-plate configuration, providing a time varying torque on the pendulum. The size and distance dependence of the torque variation will provide a means to determine any deviation from the WEP or ISL at untested scales. This talk will focus on the analysis of preliminary data and experimental sensitivity.

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