

Abstract Submitted
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Sensitivity Considerations for a Short-range Test of the Gravitational Inverse-square Law¹ DAVID SMITH², CRYSTAL CARDENAS³, A. CONRAD HARTER⁴, C.D. HOYLE⁵, HOLLY LEOPARDI⁶, Humboldt State Univ — The gravitational Inverse-Square Law (ISL) has been verified from infinity down to the 0.1 mm regime. Several theoretical scenarios predict possible violations of the ISL at short distances. At HSU we are developing an experiment that will test gravitational interactions below 50 microns. The experiment will be approximately null by using a stepped torsion pendulum and a large attractor plate. Hence, in the approximation that the attractor mass is an infinite sheet of matter, the Newtonian gravitational force is independent of separation distance between the pendulum and attractor. The experiment will measure the torque applied to the pendulum as the attractor mass is oscillated nearby. The size and distance dependence of the torque variation will provide a means to determine any deviations from the ISL at untested scales. The mass distribution of the pendulum and attractor determine the sensitivity of the experiment. This talk will focus on the investigation of the ISL and the experimental sensitivity. Gauss' Law of Gravitation, the infinite plane approximation, Yukawa potential, and Newtonian vs. Yukawa torque will be discussed.

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