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Predicted Sensitivity for Tests of Short-range Gravity with a Novel Parallel-plate Torsion Pendulum[1] MATTHEW RICHARDS[2], BRANDON BAXLEY[3], C.D. HOYLE, HOLLY LEOPARDI[4], Humboldt State University, DAVID SHOOK, CENPA (University of Washington) and Humboldt State University — The parallel-plate torsion pendulum apparatus at Humboldt State University is designed to test the Weak Equivalence Principle (WEP) and the gravitational inverse-square law (ISL) of General Relativity at unprecedented levels in the sub-millimeter regime. Some versions of String Theory predict additional dimensions that might affect the gravitational inverse-square law (ISL) at sub-millimeter levels. Some models also predict the existence of unobserved subatomic particles, which if exist, could cause a violation in the WEP at short distances. Short-range tests of gravity and the WEP are also instrumental in investigating possible proposed mechanisms that attempt to explain the accelerated expansion of the universe, generally attributed to Dark Energy. The weakness of the gravitational force makes measurement very difficult at small scales. Testing such a minimal force requires highly isolated experimental systems and precise measurement and control instrumentation. Moreover, a dedicated test of the WEP has not been performed below the millimeter scale. This talk will discuss the improved sensitivity that we expect to achieve in short-range gravity tests with respect to previous efforts that employ different experimental configurations.

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[2]undergraduate presenter
[3]undergraduate
[4]undergraduate

C.D. Hoyle
Humboldt State University

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