

Abstract Submitted
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Precision Optical Systems for Short-range Tests of Gravity¹

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— Due to the incompatibility of the Standard Model and General Relativity (GR), tests of gravity remain at the forefront of experimental physics. At Humboldt State University, undergraduates and faculty are developing an experiment that will test gravitational interactions below the 50-micron distance scale. The experiment will measure the twist of a 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 means to determine deviations from accepted models of gravity on untested distance scales. To observe the twist of the pendulum inside the vacuum chamber, an optical system with nano-radian precision is required. This talk will focus on the improvements made to the optical system such that it is expected to achieve the required sensitivity, as well as recent data taken with the updated optical system. A future improved optical system under development that will implement a small-angle interferometer to measure the twist of the pendulum will also be presented.

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