Abstract Submitted
for the FWS21 Meeting of
The American Physical Society

Optimization of an Active Leveling Scheme for Short-Range Gravity Experiment[1] ALYSSA JOHNSON, MICHAEL GENGO, CLAIRE ROGERS, C.D. HOYLE, Humboldt State University — At Humboldt State University undergraduate researchers and faculty have constructed a torsion pendulum experiment that works to measure gravitational interactions below 50 microns. The aim of this project is to look for deviations in the Weak Equivalence Principle (WEP) and/or Inverse-Square Law (ISL). The scale at which this experiment is operating is within an untested range at the millimeter scale. This apparatus torsion pendulum consists of equal masses with differing materials arranged as a composition dipole. The twist of this configuration is measured by an attractor mass that oscillates in a parallel-plate arrangement nearby. The oscillation creates a torque (time-dependent) on the pendulum which can be studied for deviations in the WEP and/or ISL. At present, an active leveling scheme has been implemented to mediate the apparatuss tilt over the course of the day. This scheme has been optimized through the use of a power supply and PID loop that mitigates the variations in tilt by way of applying a voltage via a resistor to one of the legs of the experiment. This talk will update on the progress of optimizing this tilt sensor setup.

[1]National Science Foundation PHY-1065697, PHY-1306783, PHY-1606988, PHY1908502

Alyssa Johnson
Humboldt State University

Date submitted: 16 Sep 2021 Electronic form version 1.4