Abstract Submitted
for the FWS21 Meeting of
The American Physical Society

Towards a better determination of Big G[1] EMILY ORD, Humboldt State University, MUCHUAN HUA, RUTUJ GAVANKAR, Indiana University-Perdue University Indianapolis, MARVIN QUENTEN, Indiana University, STEPHAN BALMER, Syracuse University, W.M. SNOW, Indiana University, C.D. HOYLE, Humboldt State University, R.S. DECCA, Indiana University-Perdue University Indianapolis, SYRACUSE UNIVERSITY COLLABORATION, INDIANA UNIVERSITY COLLABORATION, HUMBOLDT STATE UNIVERSITY COLLABORATION, INDIANA UNIVERSITY-PERDUE UNIVERSITY INDIANAPOLIS COLLABORATION — The Newtonian gravitational constant, G, is a fundamental constant in nature not linked by any complete theories to other forces of nature. Compared to all other fundamental constants, G is known with the least precision. Over the last 200 years, its value has been repeatedly measured, and leading experiments have produced values which are incompatible with one another. Compared to the most precise experiment, some measured values differ by up to 50 times the experimental uncertainty. Recently, two experiments have measured consistent results at the 12 ppm level. After examination of the methodology used in previous measurements, the research group at IUPUI, in collaboration with Humboldt State University and Syracuse University, will use multiple approaches to determine G within a singular torsion pendulum apparatus. We expect to obtain a measurement at the 2 ppm level using these new methods. By continuing the use of a torsion pendulum apparatus, we also hope to better understand the current discrepancies among previous experimental results. This poster will focus on the implementations made to help obtain a more precise measurement of G.

[1]NSF awards 1708024 and 1707985

Emily Ord
Humboldt State University

Date submitted: 08 Oct 2021 Electronic form version 1.4