

Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Multi-Mode Apparatus to Determine Newton's Constant G ¹

EMILY ORD, Humboldt State University, RICARDO DECCA, Indiana University Purdue University Indianapolis, CHARLES HOYLE, Humboldt State University, STEFAN BALLMER, Syracuse University, MUCHUAN HUA, Indiana University Purdue University Indianapolis, INDIANA UNIVERSITY PURDUE UNIVERSITY INDIANAPOLIS COLLABORATION, HUMBOLDT STATE UNIVERSITY COLLABORATION, SYRACUSE UNIVERSITY 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 even the world's leading experiments have produced values which are incompatible with one another. 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 same 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 talk will explore the experimental configurations and give a current update on the optical system of the experiment.

¹PHY-1708024, PHY-1707985

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Date submitted: 09 Jan 2020

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