

News & Comments

The Gravitational Constant Can Be Measured in a New Way by Scientists

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The gravitational constant was measured with incredible precision using vibrating rods by a team of physicists. They hope future improvements will offer a new pathway to identifying this elusive constant, even though the new technique has relatively high uncertainty. Gravity is understood as a result of the gravitational constant, G . When Newton developed his universal theory of gravitation over 300 years ago, he first introduced the constant into his equations. The gravitational attraction between two objects at a given distance and mass is determined by the constant, which tells us the fundamental strength of gravity. From any theory, it is impossible to calculate this constant's value. Measuring and experimenting are the only ways to discover it. We know the value of the gravitational constant relatively imprecisely since gravity is the weakest of the forces. To resolve this issue, Jürg Dual, a professor at ETH Zurich's department of Mechanical and Process Engineering, explains that we need to measure the gravitational constant using many different methods. A team led by Dual developed a new method of measuring the gravitational constant. Starting with a suspended metal bar, they vibrated the bar and measured how much an adjacent bar vibrated as well. Neither bar touched the other. In place of vibrating, the first bar emitted gravitational waves that caused the other bar to move. A dynamical system is used here instead of a static one to measure the gravitational constant. Almost everything in the universe also exerts a gravitational influence on static systems. The physicists were able to isolate their measurements much better with a dynamic system. Despite the large uncertainty, the team's measurement of the gravitational constant is about 2.2 percent higher than what is currently accepted. Dual explained that in order to obtain a reliable value, the uncertainty needs to be reduced substantially. The measurements are already underway with a slightly modified experimental setup so that the constant can be determined even more precisely". Using this new technique, Dual and his team hope to provide an independent measurement of the gravitational constant that will pay off in the future. Physicists will be able to better understand everything from black holes and gravitational waves to gravity's fundamental nature with an improved measurement.

KEYWORDS

Gravitational Constant, physics, constant, Gravity, experiment, calculation, new method, measurement, G , new technique, measuring

