Gravitational Balance

Simple, But Amazingly Sensitive—This Apparatus Lets Your Class Measure One of the Universe's Fundamental Constants!

Gravitational Balance

This innovative apparatus, developed from the traditional Cavendish pattern, is substantially less expensive than earlier models, making the measurement of the tiny but highly significant Gravitational Constant more accessible to students. It is precisely constructed and allows measurements of G to be made to better than 15% relative error using either the initial acceleration method or the equilibrium displacement method.

In the initial acceleration method, the value of G is derived from the angular acceleration of the balance during the first 90 seconds after moving the attracting masses from one side to the other. The equilibrium displacement method derives G from the change in the equilibrium position of the balance at rest due to the change in position of the large masses. The built-in oil damping system greatly reduces the time needed for equilibrium from the 2 hours needed by an undamped system.

Mounting the attracting masses on the two sliding support columns enables students to find the changes in the equilibrium position as a function of the distance of the masses from the pendulum, thus verifying the Inverse Square Law.

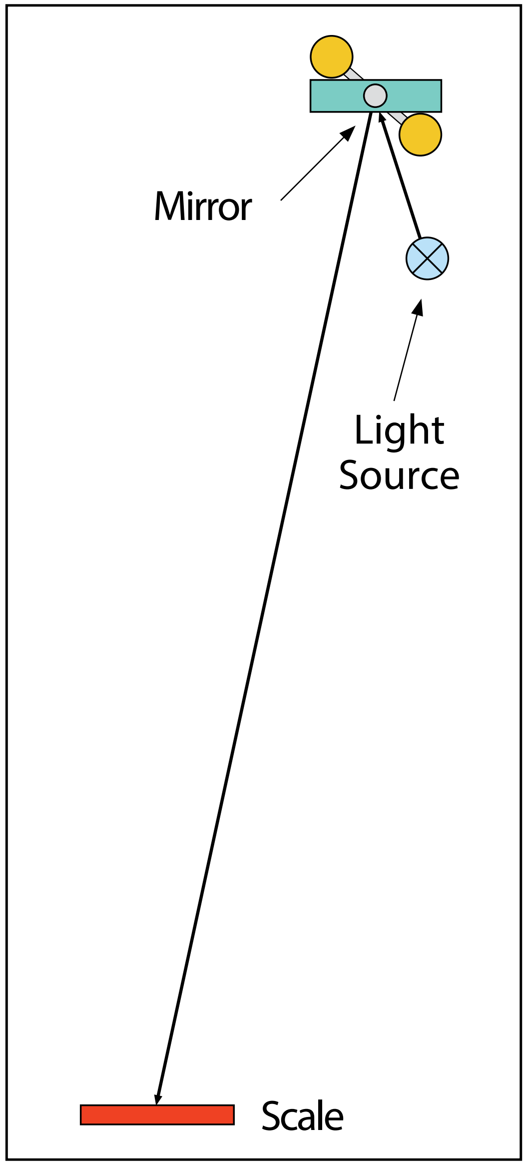
The pendulum system has a central rod carrying a small concave mirror for an optical lever, a pair of 20g lead balls mounted 10cm apart on a light crossbar, and a light damping vane. The rod is attached to a very fine beryllium bronze torsion wire 15cm long, which gives the balance an oscillation period of 590 ± 10 seconds. A solid aluminum housing, 25mm thick, encloses the pendulum system and is mounted on a 12mm-thick square aluminum base plate with three leveling screws. The attracting masses are two 1.5kg lead balls.

Damping oil and a magnet for damping motion during setup are supplied. A laser and a scale, not included, are needed for measuring angular changes using the optical lever principle. Size: 30 x 30 x 42cm, mass is 12kg.

160722 **$903.59**

Gravitational Balance

Measuring Deflection with an Optical Lever



Overhead view: measuring deflection with an optical lever.

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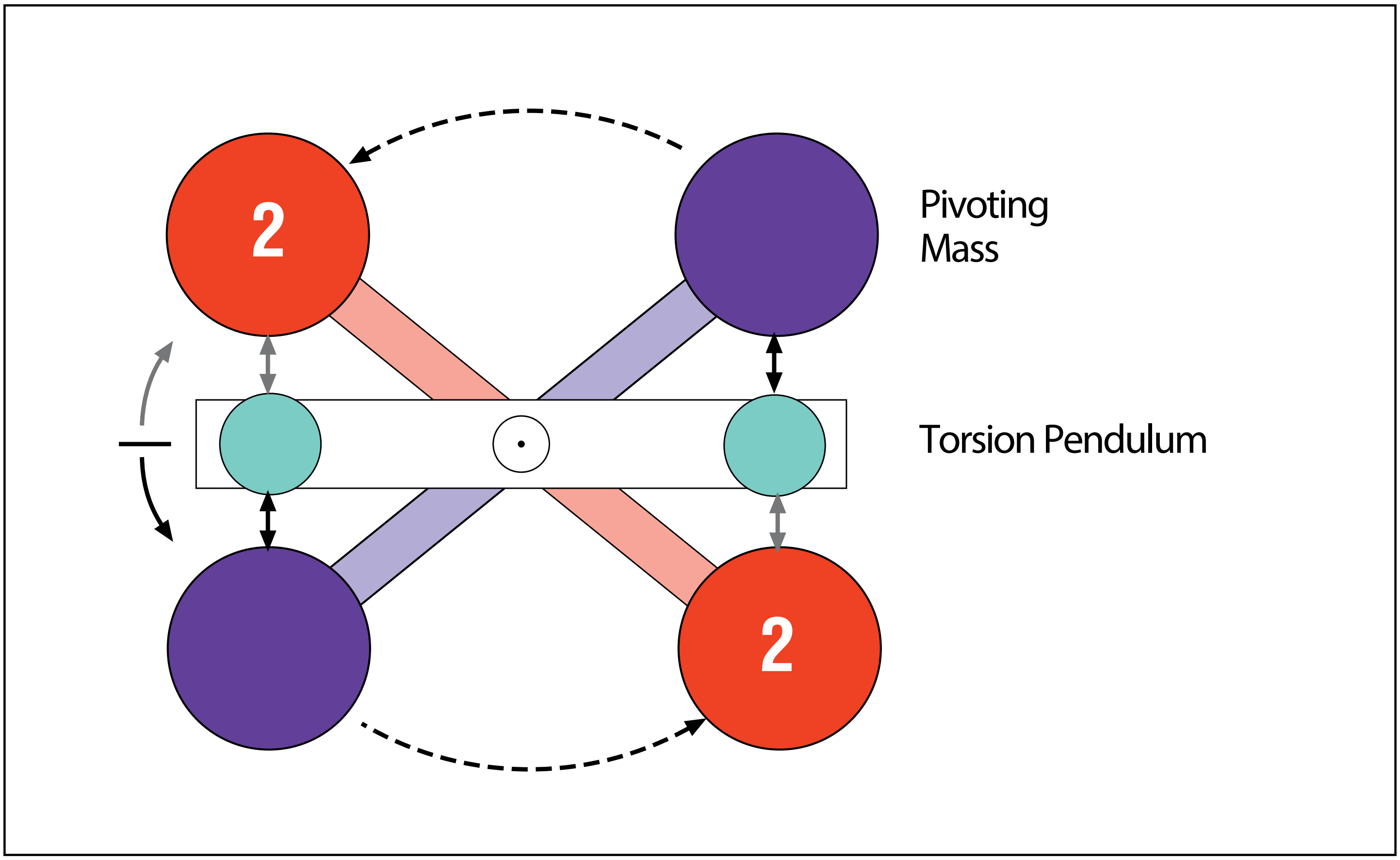
Cavendish Experiment



Schematic of Cavendish Experiment.

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