# The Physics Experiments of Robert Wichard Pohl (1884–1976)

For decades, Robert Wichard Pohl taught his famous lectures of introductory physics in the old lecture hall of the Physics Institute at Goettingen University. These lectures became the foundation for three volumes entitled „Introduction into Physics". Now, using Professor Pohl's original instruments in the same lecture hall in which he taught, this set of videos captures his extraordinary ingenuity and once more brings to life Pohl's great experimental skills.

## Measuring the velocity of a bullet

**Video title:** Measuring the velocity of a bullet

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**Series title:** The Physics Experiments of Robert Wichard Pohl (1884-1976)

**Abstract:** The large velocity of a bullet is determined using only a simple pendulum together with the knowledge of its motion, and the law of the conservation of momentum.

**Source:** Pohls Einführung in die Physik - Mechanik, Akustik und Wärmelehre. Lüders, Klaus; Pohl, Robert Otto (Hrsg.) 19. Aufl., 2005, Springer Berlin Heidelberg New York; p. 56

**Key words:** Mechanics, simple pendulum, ballistic pendulum, conservation of momentum, inelastic collision, velocity determination

**Goal of the experiment:** The determination of the large velocity of a bullet using only a simple pendulum and the knowledge of its motion, together with the law of the conservation of momentum.

**Experimental setup:** A simple pendulum with a period of 2 sec consists of a heavy bob (mass: 2.206 kg) suspended on two light metal bars. Its use as a ballistic pendulum is illustrated by hitting it briefly with a hammer, and watching its displacement (using a light bar sliding along a scale, watched both directly and in shadow projection).

**Experiment:** When the bullet (mass: 2.6 g) is fired into the pendulum bob, in which it is stopped, the displacement is measured (12 cm, see the shadow projection of the scale, each short bar indicating 2 cm). From this displacement, the period of the pendulum, and the masses of bob and bullet, the velocity v of the bullet can be calculated to be v = 320 m/sec. All that is required for the analysis is the knowledge of the motion of a simple pendulum, and of the law of the conservation of momentum.

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