

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.



Electromagnet

Video title: Electromagnet

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

Abstract: It will be shown that in a small electromagnet surprisingly large forces can be generated. However, these forces decrease drastically with the introduction of only a small gap between the pole faces.

Source: Pohls Einführung in die Physik - Elektrizitätslehre und Optik. Lüders, Klaus; Pohl, Robert Otto (Hrsg.) 22. Aufl., 2006, Springer Berlin Heidelberg New York; p. 108, 109, 195

Key words: Forces in electromagnets, influence of small gaps.

Goal of the experiment: The demonstration of the very large forces occurring in electromagnets, and also of the influence of very narrow gaps on these forces.

Experimental setup: A small electromagnet is operated with a 1.5 V dry cell. Its carrying power is demonstrated, first without, then with a small gap produced by inserting a few sheets of paper between the two poles.

Experiment: The current in the magnet is only 0.8 A. Nonetheless it can carry more than 50 kg. If, however, the two pieces of iron are separated by as little as 0.4 mm by inserting some pieces of paper, it can carry no more than 1.2 kg. This is a highly informative observation. For its understanding, one has to apply the two fundamental Maxwell Equations governing the properties of static magnetic fields.

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