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.

Induction in conductors in motion

Video title:	Induction in conductors in motion
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Abstract:	A conductor moving in a magnetic field experiences an electric field.
Source:	Pohls Einführung in die Physik - Elektrizitätslehre und Optik. Lüders, Klaus; Pohl, Robert Otto (Hrsg.) 22. Aufl., 2006, Springer Berlin Heidelberg New York; p. 72, 75.
Key words:	Induction, moving conductors, magnetic field, Lorentz force.

Goal of the experiment: The electric field observed when an induction coil or its parts are moved in a constant magnetic field will be studied using an induction coil. The analysis of the experiment can be done using the Lorentz force.

Experimental setup: Initially, the same set-up is used as in the experiment " Induction in conductors at rest". Thereafter, an induction coil of a single winding inside a solenoid is projected onto the wall of the lecture hall. Its area can be changed from the outside with a handle .

Experiment: In part one , the induction coil is removed from the solenoid. The observed voltage pulse is identical to that observed in the previous experiment, with the induction coil at rest, when the solenoid current had been turned off. Even the sign is the same. Not shown is that in this experiment, too, the voltage pulse is proportional to the current, and also that it is independent of the speed with which the induction coil is being removed. In part two, it is shown that moving a part of the induction coil also leads to a voltage pulse. By reducing the area of the induction coil to (almost) zero, the observed voltage pulse is (almost) equal to the one measured when the solenoid current is turned off without reducing the area of the induction coil. The explanation of the small difference is that the area of the induction coil cannot be reduced exactly to zero, as can be seen in the projection.

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