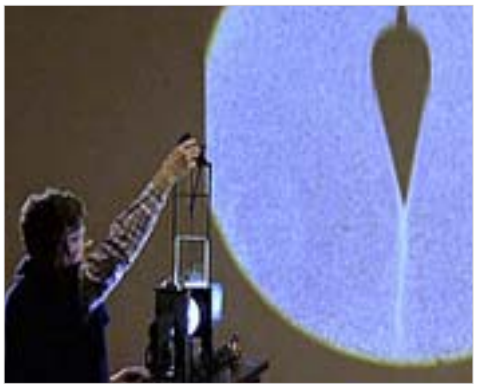
The Physics Experiments of Robert Wichard Pohl (1884–1976)

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.



Fluid flow around obstacles

Video title: Fluid flow around obstacles

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

Abstract: Fluid flow around several objects and the effect of viscosity are shown in a two-dimensional apparatus. Aluminum tinsel has been added to the fluid to indicate locally the instantaneous direction and magnitude of the velocity of the fluid.

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. 155, 159, 167 – 169

Key words: Mechanics, viscous fluids, flow around obstacles, vortices

Goal of the experiment: The flow and the vortices occurring as a viscous fluid flows around differently shaped objects will be shown in a two-dimensional apparatus.

Experimental setup: A vertical container with glass plates separated by 1 cm is filled with water. Inside, objects of different shapes can be moved up or down. In this way the effect of viscosity on the motion around the objects can be observed in two-dimensional projection. Aluminum tinsel added to the water indicate locally magnitude and direction of the flow.

Experiment: The following objects are moved in turn in the fluid:

1. a horizontal plate being moved upward,
2. a streamlined shaped object, and
3. a body with the profile of an airplane wing.

In all cases, the flow patterns are easy to observe. For example, when the airplane wing, with its upper surface pointing to the right is being moved upwards, the vortex formed initially, which rotates counter-clockwise, can readily be seen, and also the onset of the fluid flowing clockwise around the wing, which leads to the lift experienced by the wing.

Scientific Contributors:

Klaus Lüders	Department of Physics, Free University Berlin, Germany
Robert Otto Pohl	Laboratory of Atomic and Solid State Physics, Cornell University, Ithaca, USA
Gustav Beuermann	I. Physical Institute, University Goettingen, Germany
Konrad Samwer	I. Physical Institute, University Goettingen, Germany

Editor: Walter Stickan
Camera: Kuno Lechner
Sound: Thomas Gerstenberg
Video Editing: Abbas Yousefpour
Technical Assistant: Joachim Feist

Production and Distribution: IWF Wissen und Medien gGmbH, http://www.iwf.de,

IWF Wissen und Medien gGmbH
Nonnenstieg 72, D-37075 Goettingen
Phone: +49 (0) 551 5024 0
www.iwf.de

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