

# 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.



## Polarized light

**Video title:** Polarized light

**Signature:** C 14897

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

**Abstract:** The plane of polarization of a light beam which has been polarized by passing it through a Nicol prism is made visible through scattering in a slightly milky liquid.

**Source:** Pohl's Einführung in die Physik - Elektrizitätslehre und Optik. Lüders, Klaus; Pohl, Robert Otto (Hrsg.) 22. Aufl., 2006, Springer Berlin Heidelberg New York; p. 205, 372, 332

**Key words:** Optics, Nicol Prism, polarized light, light scattering

**Goal of the experiment:** The plane of polarization of a light beam is made visible through scattering in a milky liquid.

**Experimental setup:** A light beam is produced with a condenser placed in front of a carbon arc lamp. The light is polarized by passing it through a Nicol prism which can be rotated around a horizontal axis lying in the direction of the light beam. Its orientation is indicated with a rod painted red, which can also be used for rotating the prism. The light beam passes through a water-filled trough. The water contains polystyrene particles as scattering centers. The scattered light is detected visually.

**Experiment:** The scattered light is viewed by looking perpendicularly at the light beam. As the Nicol prism is rotated, the plane of polarization of the electric field vector also rotates. Initially, it is oriented vertically. When the carbon arc is turned on, the scattered light beam can be seen weakly in the trough. After adding the cloud of polystyrene particles, the scattered light is seen as a bright beam. When the polarizer is rotated so that the plane of the field vector is horizontal, the light becomes practically invisible. The amplitude of the electric field vector cannot be detected by the eye if it points, as in this case, in the direction of the viewer. If the viewer now looks at the beam not at right angles, the scattered light becomes visible again. For this part of the experiment, the entire apparatus is rotated around a vertical axis.


### 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

<b>Editor:</b>	Walter Stickan
<b>Camera:</b>	Kuno Lechner
<b>Assistant:</b>	Gudrun Schwarz, Natalie Frick
<b>Sound:</b>	Thomas Gerstenberg, Karl-Heinz Seack
<b>Video Editing:</b>	Abbas Yousefpour
<b>Technical Assistant:</b>	Joachim Feist

**Production and Distribution:** IWF Wissen und Medien gGmbH, <http://www.iwf.de>, © IWF Goettingen 2006

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

 **Leibniz  
Gemeinschaft**

**IWF**  
WISSEN UND MEDIEN  
KNOWLEDGE AND MEDIA