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.

Spherical aberration

Video title: Spherical aberration

Signature: C 14893

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

Abstract: The imaging error called spherical aberration is demonstrated by imaging a small coil of a light bulb

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Key words: Optics, defective imaging, spherical aberration

Goal of the experiment: The imaging error called spherical aberration is demonstrated by imaging a small coil of a light bulb.

Experimental setup: The coil of a small light bulb is imaged onto the wall of the lecture hall using a lens with spherical surfaces and several cm diameter. Metal disks of different shapes are placed in front of the lens, so that either only its central region, or its outer region is used for the imaging.

Experiment: Initially, the coil is imaged using the entire surface of the lens, moving it until a well-focused image is seen on the wall. (Besides the coil itself, its reflected image caused by a mirror in back of the coil can be seen.) Now a screen with a large hole is moved into the light path, so that light can only travel through the central section of the lens. The image of the coil becomes even clearer. By contrast, if by covering this central portion, light is allowed to travel only through an outer ring of the lens, the image of the coil becomes completely obscure. Only by moving a white cardboard closer to the lens, an image can be seen. This is called spherical aberration. The quality of the image, however, is greatly reduced, and also shows evidence for chromatic aberration.

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