

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.



Angular momentum as a vector

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Abstract: A ventilator which can rotate freely around a vertical axis can be used to demonstrate that the angular momentum is a vector.
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Goal of the experiment: A ventilator which can rotate freely around a vertical axis can be used to demonstrate that the angular momentum is a vector.

Experimental setup: A ventilator is mounted so that it can rotate freely around a vertical axis. It can also be tilted so that the air is blown either horizontally or upward. The motion of the ventilator is shown clearly using shadow projection, a technique characteristic for Pohl's lecture demonstrations and also his books.

Experiment: Upon turning on the ventilator, both the propeller and the driven air jet receive an angular momentum. Its vector points in the direction of the jet, parallel to the axis of the propeller. The ventilator receives an equal angular momentum in the opposite direction (opposite sense of rotation). The experiment is carried out for two different orientations of the ventilator:

1. The propeller axis is horizontal. The vector of the angular momentum of the propeller and air jet have no vertical component. The ventilator remains at rest, since it cannot rotate around a horizontal axis (the angular momentum is taken up invisibly by the ventilator stand and the earth).
2. The axis of the propeller is tilted upward by ~ 45 degrees. In this orientation, the vertical component of the angular momentum causes the case to rotate in the opposite sense.

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