

# TM 611

## Rolling disk on inclined plane



### Description

#### ■ inertia in rotational motion on an inclined plane and in a physical pendulum

The mass moment of inertia is a proportionality constant, which depends on both the body and the position of the body's rotation axis. By measuring the rotary moment and the resulting angular acceleration, we can experimentally determine the mass moment of inertia. To do this, the TM 611 unit offers rolling experiments on an inclined plane and pendulum experiments with a physical pendulum to determine mass moments of inertia experimentally. In the rolling experiment, the inclination of the inclined plane is set through height adjustment and read on a goniometer.

A disk rolls down the track. The time and the acceleration distance are measured, and the mass moment of inertia is calculated.

To conduct the pendulum experiments, the disk is hung in a mount. The rotation axis of the disk is displaced by a specific distance from the centre of gravity. The disk is deflected and rolls back and forth in a pendulum motion. The mass moment of inertia is calculated from the measured time during the swaying, the mass and the distance to the centre of gravity (Steiner's theorem).

Two different disks are available. The experiments are precisely aligned with spirit levels.

### Learning objectives/experiments

- proof of the law of falling bodies on the inclined plane
- influence of the mass of a body on its acceleration
- determine the mass moment of inertia by rolling experiment and pendulum experiment
- Steiner's theorem

### Specification

- [1] investigation of inertia in rotational motion
- [2] proof of the law of falling bodies
- [3] experimentally determine the mass moments of inertia
- [4] rolling experiments on an inclined plane with height adjustment and three-point support
- [5] pendulum experiments with a physical pendulum
- [6] goniometer and spirit levels ensure precise alignment
- [7] measure the time and the acceleration distance

### Technical data

#### Roll track

- length: max. 1000mm
- angle of inclination: 0°...7°

#### Disks

- mass: 320g and 620g
- diameter: 70mm and 100mm

#### Rotary axis

- diameter: 10mm
- distance to centre of gravity: 10mm

LxWxH: 1180x480x210mm

Weight: approx. 10kg

### Scope of delivery

- 1 experimental unit
- 1 set of weights
- 1 set of instructional material

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Optional accessories

020.30009      WP 300.09      Laboratory trolley