Bicycle Wheel Gyro
Prandtl's Rotating Disc

02565.00
02571.00

Operating Instructions

1 PURPOSE AND DESCRIPTION

The bicycle wheel gyro is used together with the rotating disc for the verification of the law on the conservation of angular momentum. It consists of a spoked wheel with handles on both ends of the axle. The wheel rim has an iron insert to increase the moment of inertia. The cord drum is used to set the gyro in motion. Prandtl's rotating disc (rotating stool) has a foot rest and can be turned about its low-friction vertical axis.

2 OPERATION

The two handles are firmly screwed to the axle on the bicycle wheel gyro.

Setting the gyro in motion

- In many cases it is sufficient to hold the gyro with one hand and to rotate the rim using the other hand.
- For higher speeds the supplied nylon cord is wound on the cord drum with the start of the cord being held down by the following windings. Place the gyro with the handle opposite the cord drum in the supplied pan which is held in a support base. The gyro is set in motion by pulling the cord.

Important: Never try to touch the spokes of the rotating bicycle wheel gyro! Only grasp it by the outside of the rim when setting it in motion or for braking. The cord used to set the wheel in motion should not be longer than 1.5 m so that the gyro does not run at an unnecessarily fast speed. Always hold the gyro with both hands!

The rotating stool is placed on a floor which is as level as possible, but a slight inclination hardly interferes with the experiment.

3 EXPERIMENTS

The experimenter sits on the stationary stool and holds in his/her hands the bicycle wheel gyro which is also stationary.

3.1 Hold the wheel axle *vertical* and set the gyro in motion by hand: The stool begins to rotate in the opposite direction to the gyro. Brake the gyro or bring the wheel axle to the horizontal position: The stool comes to rest.

3.2 Hold the wheel axle *horizontal* and set the gyro in motion by hand: The stool remains at rest.
Bring the wheel axle into the vertical position: The stool begins to rotate in the opposite direction to the gyro.

The experimenter sits on the stool which is stationary; a second person holds the gyro and sets it in motion with the cord.

3.3 Rotating gyro - wheel axle vertical - take the gyro: The stool remains stationary.
Tilt the wheel axle from the vertical ($\alpha = +90°$) to the horizontal ($\alpha = 0°$) and further to $\alpha = -90°$: The stool begins to rotate in the same direction of rotation as the gyro; the rotation is fastest for $\alpha = -90°$.
Bring the wheel axle back to the initial position: The stool comes to rest.

3.4 Rotating gyro - wheel axle horizontal - take the gyro: The stool remains stationary.
Tilt the wheel axle from the horizontal ($\alpha = 0°$) upwards ($\alpha = +90°$) and downwards ($\alpha = -90°$): The observations are the same as described in 3.2.

The experimenter holds two weights in his/her hands (e.g. Commercial Weights, 5kg, order no. 44096.81).

3.5 During the rotation stretch out the arms and pull them in again: The speed of rotation changes.

4 EXPERIMENT LITERATURE

Versuchseinheiten Physik,
Rotationsenergie und Drehimpuls 16000.51