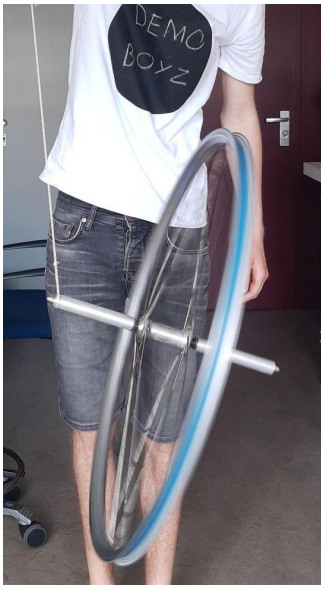
Bike wheels - gyroscopic precession

Key words: Angular momentum, precession, gyroscopes



Equipment List:

1. Bike wheel with handles
2. String with a loop tied in it

How to assemble and operate:

- Spin the wheel up to a relatively fast speed
- Hang the wheel from the string
- Observe how the axis stays mostly horizontal but starts precessing around the string
- Stop the precessing and observe how the wheel drops down from being horizontal

Description/Theory:

This demonstration shows Gyroscopic precession, which is a phenomenon that arises when a torque is applied to a spinning wheel (in an axis other than the one the wheel is spinning around). Because not all parts of the wheel are equidistant to the axis of the torque, the coriolis effect causes a torque in the 3rd axis, inducing a rotation. This rotation then induces a counter-torque in the original axis, keeping the wheel horizontal. This also explains why the wheel drops down once the precession is stopped.

Comments/Notes:

Flywheels can be dangerous, brake the wheel using an object or the floor