Conservation of angular momentum for elastic torsion impact (P 1.4.2.1)

P 1.4.2

Conservation of angular momentum

P 1.4.2.1 CASSY S Conservation of angular momentum for elastic torsion impact

P 1.4.2.2 CASSY S Conservation of angular momentum for inelastic torsion impact

Cat. No.	Description	P 1.4.2.1-2
347 23	Rotation model	1
300 76	Laboratory stand II	1
337 46	Forked light barrier, infra-red	2
524 074	Timer S	1
501 16	Multicore cable, 6-pole, 1.5 m long	2
524 010USB	Sensor CASSY	1
524 200	CASSY Lab	1
	additionally required: 1 PC with Windows 95/NT or higher	1

Torsion impacts between rotating bodies can be described analogously to one-dimensional translational collisions when the axes of rotation of the bodies are parallel to each other and remain unchanged during the collision. This condition is reliably met when carrying out measurements using the rotation model. The angular momentum is specified in the form

$$L = I \cdot \omega$$

I: moment of inertia, ω: angular velocity.

The principle of conservation of angular momentum states that for any torsion impact of two rotating bodies, the quantity

$$L = I_1 \quad \omega_1 + I_2 \cdot \omega_2$$

before and after impact remains the same.

The two experiments investigate the nature of elastic and inelastic torsion impact. Using two forked light barriers and the computer-assisted measuring system CASSY, the obscuration times of two interrupter flags are registered as a measure of the angular velocities before and after torsion impact. The CASSY Lab uses the obscuration times Δt and the angular field $\Delta\varphi = 10°$ of the interrupter flags to calculate the angular velocities

$$\omega = \frac{10°}{\Delta t}$$

as well as the angular momentums and energies before and after impact.