STANDING LONGITUDINAL WAVES

SWD 02.08

Material:

Item Code	Qty	Description
DS101-1G	1	Support base, large, L=500 mm
DS600-6G	1	Board holders, pair, magnetic
DS103-1P	1	Panel, green/white, 900x610mm
DW452-2S	1	Vibration generator
DS110-43	1	Magnetic base, d=43 mm, with tube and pin
DM281-1H	1	Hook with plug
DS110-43	1	Magnetic base, d=43 mm, with tube and pin
P3120-1B	1	Rechargeable battery, "inno", 6V/10 Ah
P3120-1G	1	Function generator with digital display "inno"
DG507-37	2	Safety connecting lead, 37 cm, yellow

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Goal:

Formation of standing longitudinal waves by superposition of excited longitudinal wave and longitudinal wave reflected at fixed end.

Setup:

The two board holders are mounted in front of the center rail on the foot cheeks of the large support base. The mounting plate is tacked to the plate carriers in an upright position.

The vibration generator is placed centrally in front of the panel.

The hook with plug is inserted into the sleeve of the metal cylinder (on the vibration generator). The cylinder must be locked in place!

The magnetic base with tube is attached to the panel in the upper right area.

One loop of the coil spring is threaded into the hole of the bearing bolt; the other loop is hooked into the attachment of the vibration generator.

The vibration generator is moved so that the coil spring is vertical.

The "inno" function generator is plugged onto the "inno" battery and both devices are tacked to the panel.

The function generator is connected to the vibration generator with two connecting leads.

The following settings are selected on the function generator:

100 Hz
„Sine ~“

The amplitude is chosen very low.

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Experiment:

At the function generator, select an output voltage that is not too high and initially a low frequency.

Increase the frequency while observing the feather until the characteristic bellies and nodes form.

The distance between two nodes is half a wavelength.

Hinweis:

With stroboscopic illumination, a momentary state of the spring can be observed at a suitable frequency

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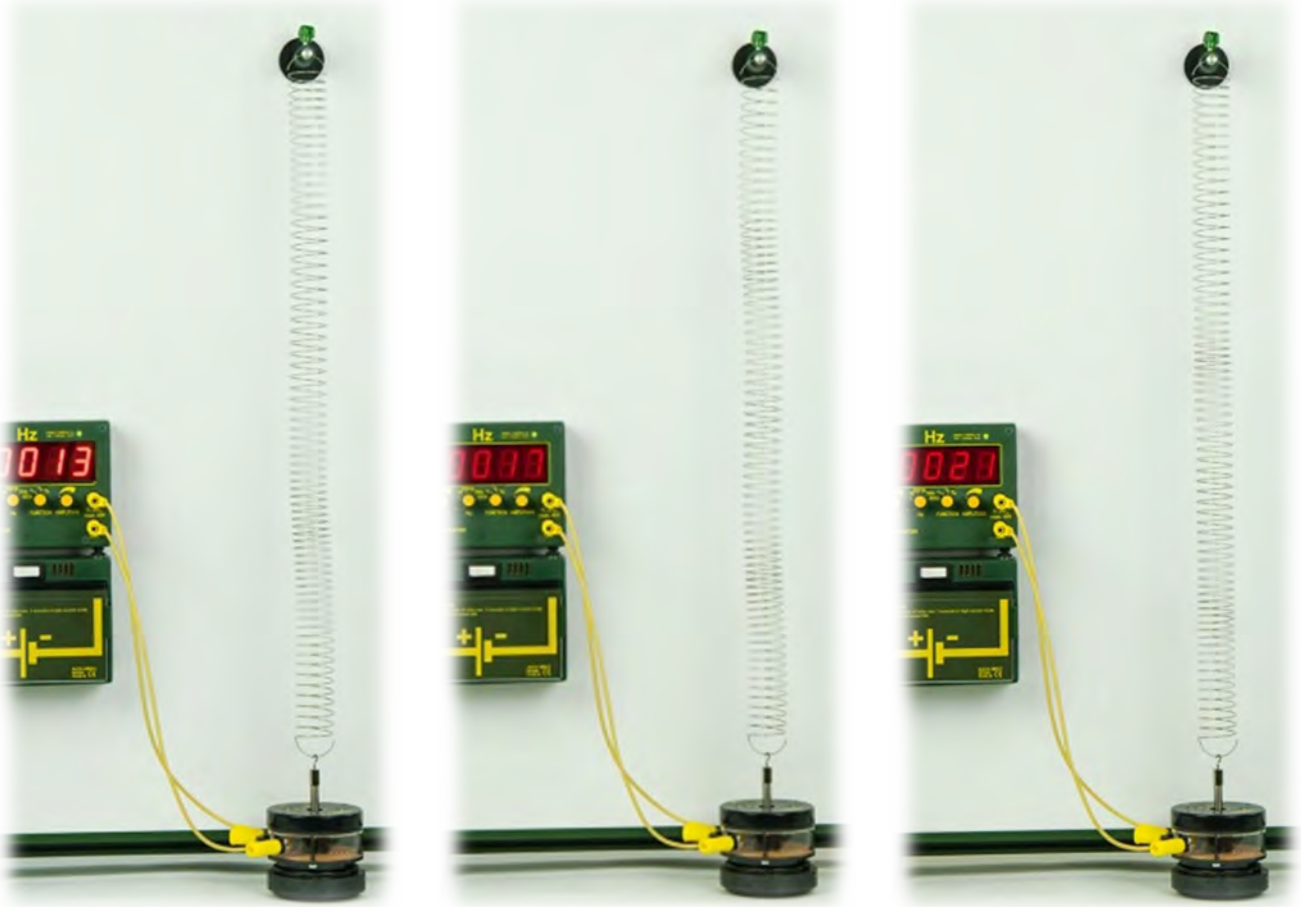

Note:

Frequenz und Wellenlänge sind indirekt proportional,. λ . f = c is constant.

By measuring λ and reading f, the propagation velocity c of the wave can be easily determined.

In the case of sound waves, reflection from a solid obstacle results in the same standing waves with very quiet spots (nodes) and loud spots (spots of strong oscillation) - e.g. in Kundt's tube.