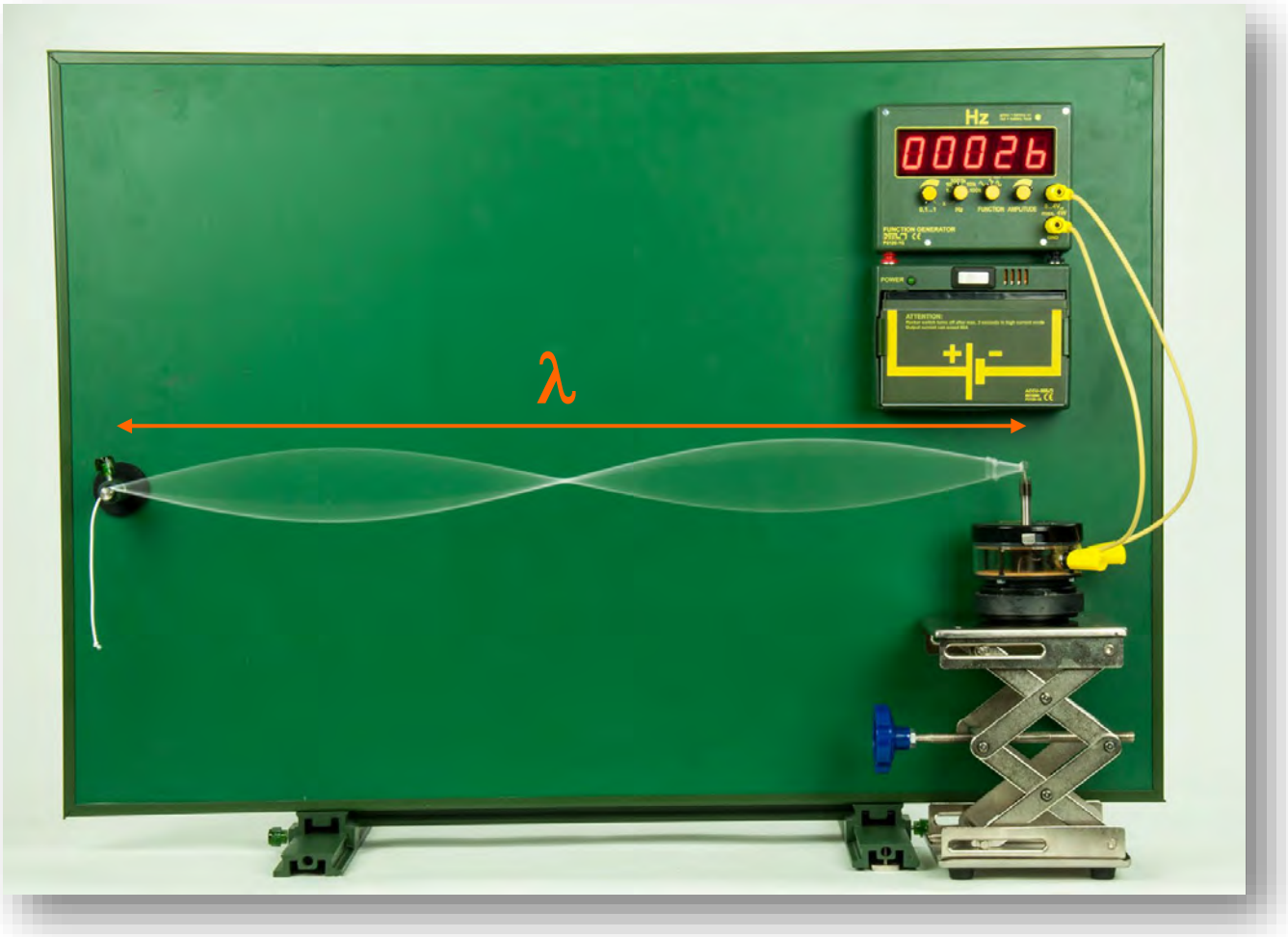
STANDING TRANSVERSAL WAVES

SWD 02.07



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
DM281-1H	1	Hook with plug
DS110-43	1	Magnetic base, d=43 mm, with tube and pin
DW451-2R	1	Elastic string, white, L=300 cm
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:

If two waves of the same wavelength overlap in a medium, standing waves are formed - waves that do not appear to travel.
Special case: Waves of the same frequency run counter to each other; e.g. outgoing and reflected wave.

Setup:

The two board holders are mounted in front of the center rail on the foot cheeks of the support base large. The panel is stapled to the board holders.

The vibration generator is placed on the laboratory lifting table at the right end of the plate.

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

The magnetic base with tube is attached to the left side of the board at about mid-height.

From the rubber cord is cut about 100 cm. On one side of the thread is tied a loop.

The loop is hooked into the hook on the vibration generator.

The rubber thread is stretched slightly, wound once over the axis of the bearing pin, the bearing pin is then pressed in tightly and screwed into the clamping column of the magnetic base.

The magnetic base is adjusted in height so that the rubber thread is horizontal.

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

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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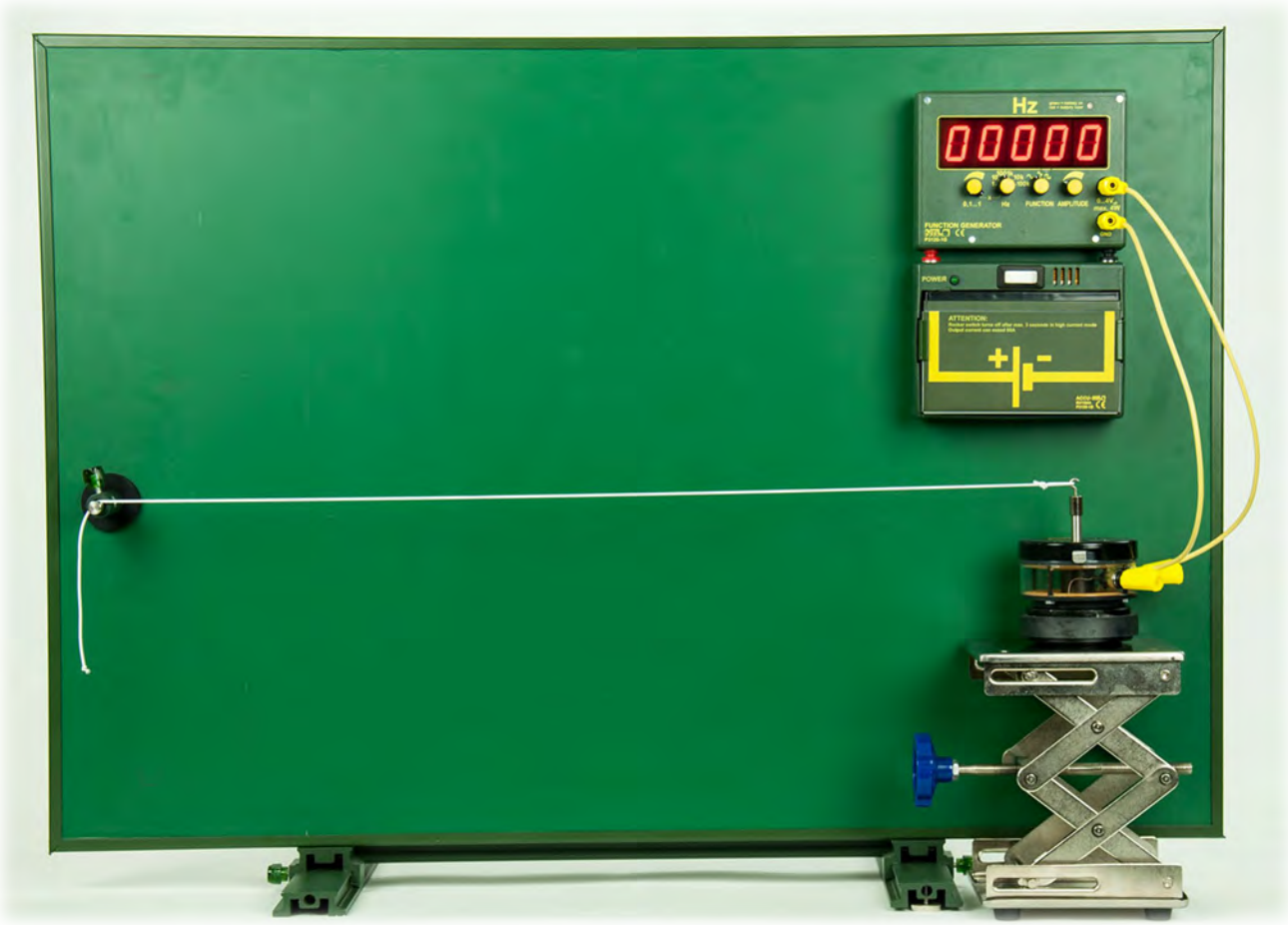

Experiment:

The battery is switched on.

Starting at about 10 Hz, the frequency is ramped up with the (left) control for fine adjustment.

As soon as bellies and nodes form, the amplitude can be adjusted up a bit.

Result:

At certain frequencies, nodes and bellies form, a standing wave occurs. First a belly can be seen. If the frequency is increased, more nodes and bellies are formed.

The distance between two nodes is half a wavelength λ

The higher the frequency, the smaller the wavelength.

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Note:

Frequency and wavelength are indirectly proportional, d x h x λ x f = c is constant.
By measuring λ and determine f, the propagation velocity c of the wave can be easily determined with standing waves.