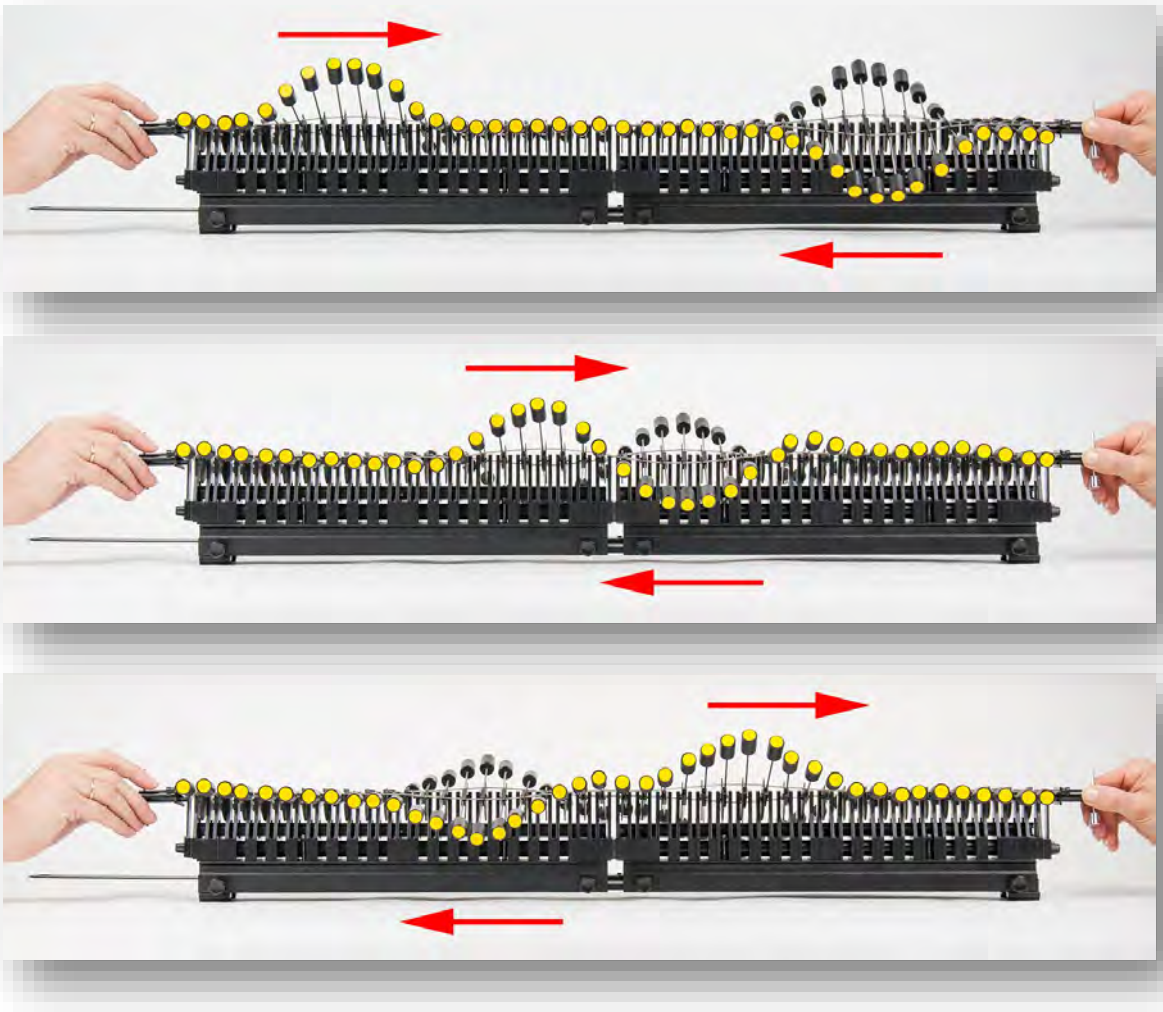
SUPERPOSITION OF WAVES

SWD 03.04



Material:

Item Code	Qty	Description
DW405-1A	**1**	**Oscillation module 1 – set consisting of**
DW405-1A1	1	Oscillation module 1 with brake
P5312-1A	2	Little base with damping
DW405-3P	1	Pendulum bearing for wave demonstrator
P7230-4E	1	Bearing pin
DG205-1G	1	Hook metal, with handle
DW405-1E	**1**	**Wave demonstrator - Module II consisting of**
DW405-1E1	1	Oscillation module 2a with brake
P5310-1S	1	Rail bond SE, universal
DW405-3SL	2	Coupling spring 80 cm, for wave demonstrator
DW405-2D	**1**	**Wave demonstrator - Mechanical damping unit consisting of**
DW405-3P	1	Pendulum bearing for wave demonstrator
P7230-4E	1	Bearing pin

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Purpose

The aim of this experiment is to observe what happens when two waves collide.

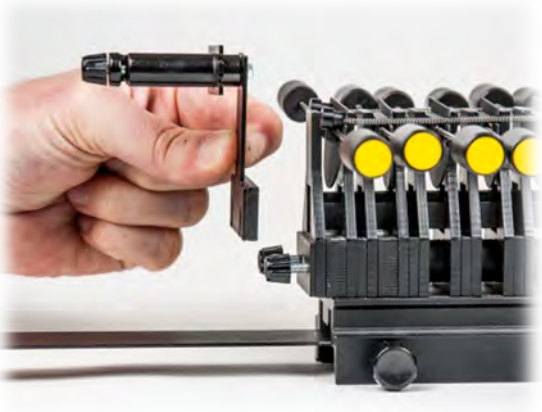
Setup

The two oscillation modules are coupled with the rail connector, thus we get a "wave machine" with a length of 80 cm

It should be noted that the two brake springs must also be coupled.

The pin of one spring must snap into the hole in the second spring.

The little bases are inserted and screwed tight at the outer ends of the wave machine.



The pendulum bearing is mounted at the end with the long brake spring.

The bearing pin is screwed tight in the vertical slot of the pendulum bearing.

At the end with the short brake spring, the second pendulum bearing (part of the damping unit) is mounted.

The two 80 cm long coupling springs are hooked into the upper slit of the pendulum.

The two pendulum bearings are also included.

Experiment 1a

All pendulum rods are brought into a horizontal position.

Create wave crests with both hands at both ends of the oscillation module with a small, but preferably the same amplitude.

The bearing pin is deflected by hand about 15 ° and then turned back to the starting position. This movement should be done quickly.

The first pendulum body of the oscillation module is thereby deflected in an up and down movement and then returned to the starting point again.

Observe the movements of the pendulums!

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Experiment 1b

Now create “valleys” of waves with both hands at both ends of the oscillation module with the same amplitude as possible.

The course of the wave movements is observed.

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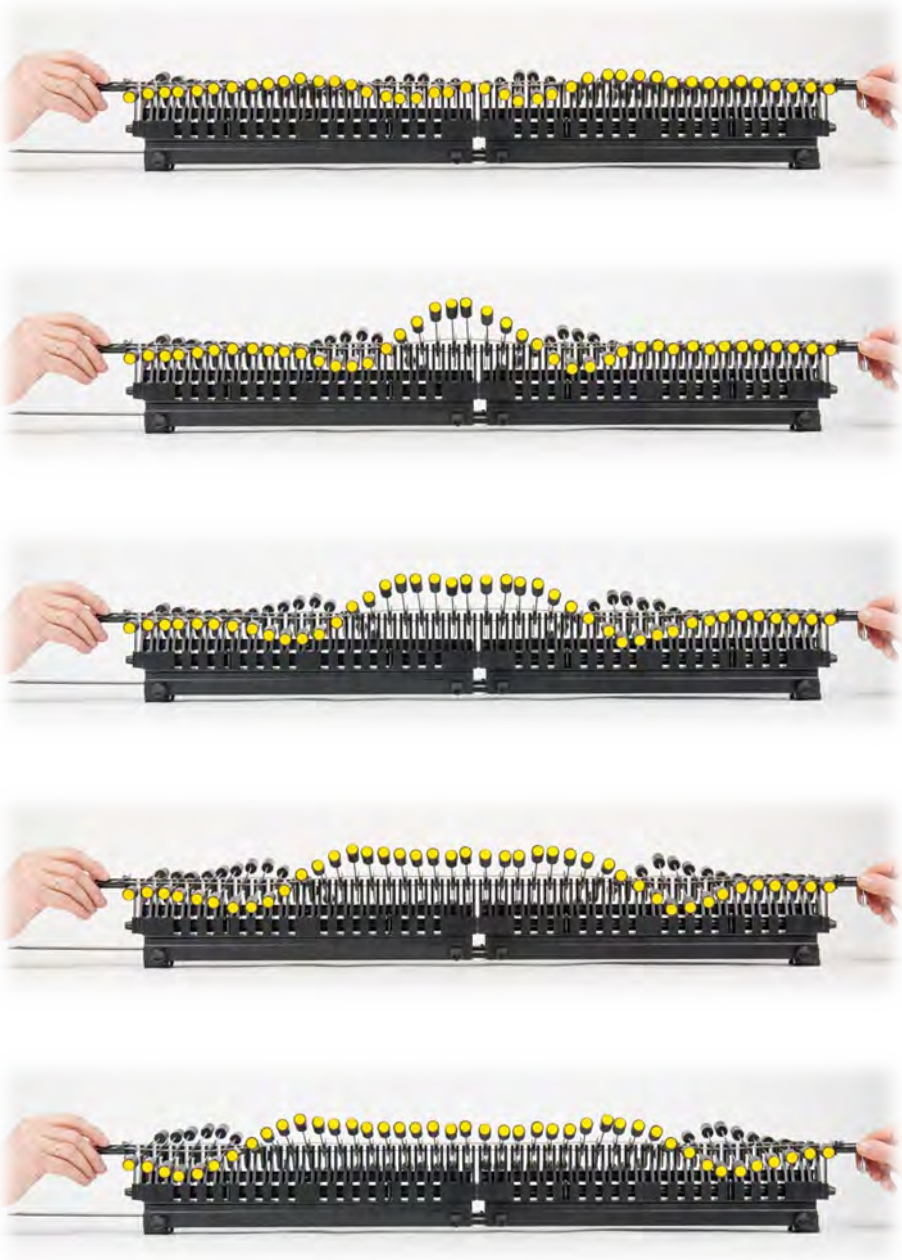

Results

The waves run towards each other.

If two wave crests or “valleys” of waves meet, they overlap, thereby forming a larger wave, but then continue as "normal valleys" again.

This phenomenon is called "constructive interference".

Experiment 2

A valley of wave is created at one end and a wave crest at the other end.
The course of the wave movements is observed again.

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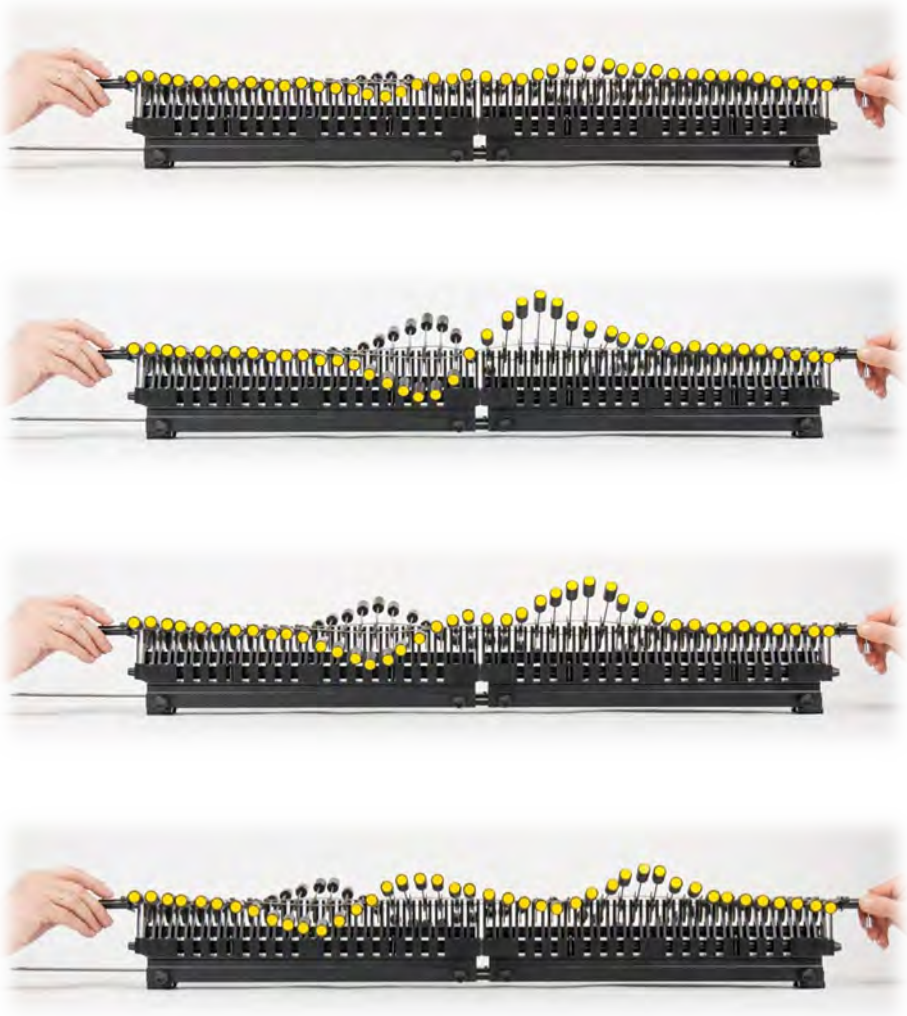

Result

When the wave crest and the “valley” of the wave meet, the crest and valley cancel each other out (with the same amplitude and wave length), but then continue to move undisturbed.

This phenomenon is called “destructive interference”.

Conclusion

If two waves meet, their deflections add up. After that, each wave continues as if the other did not exist. We speak of the "principle of undisturbed superimposition" or "interference".