1.5.09-11 Interference of acoustic waves, stationary waves and diffraction at a slot with Cobra3

What you can learn about ...

- ➔ Interference
- ➔ Reflection
- ➔ Diffraction
- ➔ Acoustic waves
- ➔ Stationary waves
- ➔ Huygens-Fresnel principle
- ➔ Use of an interface

Principle:

– Two acoustic sources emit waves of the same frequency and if their distance is a multiple of the wavelength, an interference structure becomes apparent in the space where the waves are superimposed.

– An acoustic wave impinges perpendicularly onto a reflector, the incident and the reflected wave are superimposed to a stationary wave. In case of reflection, a pressure antinode will always occur at the point of reflection.

What you need:

Sound head	03524.00	2
Measuring microphone	03542.00	1
Flat cell battery, 9 V	07496.10	1
Screen, metal, 300×300 mm	08062.00	2
Function generator	13652.93	1
Right angle clamp -PASS-	02040.55	1
Stand tube	02060.00	4
Barrel base -PASS-	02006.55	4
Bench clamp -PASS-	02010.00	1
Plate holder	02062.00	1
Meter scale, demo. l = 1000 mm	03001.00	1
Silk thread, l = 200 m	02412.00	1
Weight holder 1 g	02407.00	1
Connecting cord, 1000 mm, red	07363.01	1
Connecting cord, 1000 mm, blue	07363.04	1
Movement sensor with cable	12004.10	1
Adapter, BNC-socket/4mm plug pair	07542.27	2
Adapter, BNC socket - 4 mm plug	07542.20	1
PC Cobra data cable RS232, 2 m	12100.01	1
Power supply, 12 V	12151.99	1
Cobra3 Basic Unit	12150.00	1
Cobra3 Force/Tesla Measurement Software	14515.61	1
Connecting cord, l = 500 mm, red	07361.01	1
Connecting cord, l = 500 mm, blue	07361.04	1
RS232 data cable	14602.00	1
PC, Windows® 95 or higher		

Complete Equipment Set, Manual on CD-ROM included

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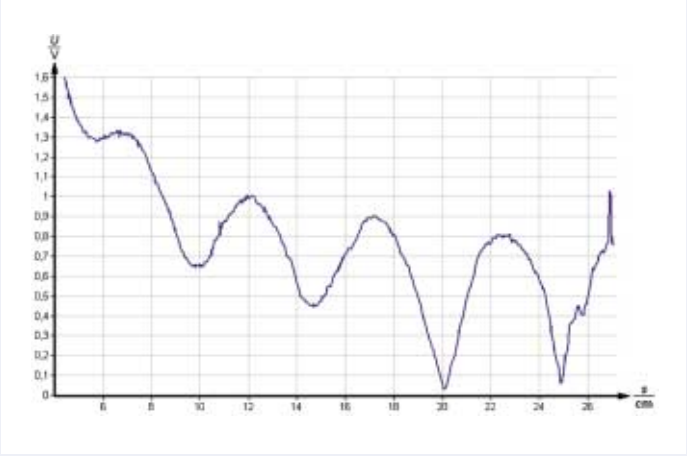

Measurement example, stationary waves.

Tasks:

1. To measure the interference of acoustic waves.
2. To analyze the reflection of acoustic waves – stationary waves.
3. To measure the diffraction at a slot of acoustic waves.

– An acoustic wave impinges on a sufficiently narrow slot, it is diffracted into the geometrical shadow spaces. The diffraction and the interference pattern occurring behind the slot can be explained by means of the Huygens-Fresnel principle and confirm the wave characteristics of sound.