

## 1.5.17–11 Diffraction of ultrasonic waves at a pin hole and a circular obstacle with Cobra3



## What you can learn about ...

- Huygens principle
- Longitudinal waves
- Interference
- Fraunhofer and Fresnel diffraction
- Fresnel's zone construction
- Poisson's spot
- Babinet's theorem
- Bessel function

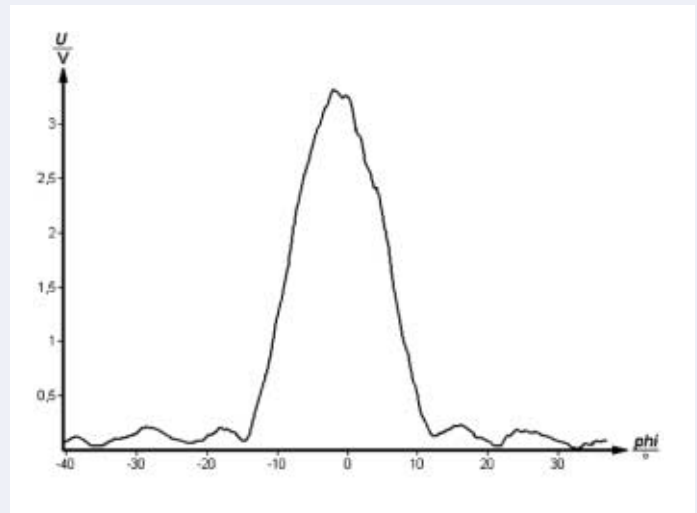
## Principle:

A plane ultrasonic wave is subjected to diffraction by a pin-hole obstacle and a complementary circular obstacle. The intensity distribution of the diffracted and interfering partial waves are automatically recorded using a motor-driven, swivel detector and an interface system.

## What you need:

Goniometer with reflecting mirror	13903.00	1
Power supply for goniometer	13903.99	1
Ultrasonic unit	13900.00	1
Power supply f. ultrasonic unit, 5 VDC, 12 W	13900.99	1
Ultrasonic transmitter on stem	13901.00	1
Ultrasonic receiver on stem	13902.00	1
Object holder for goniometer	13904.00	1
Pin hole and circular obstacle f. ultrasonic	13906.00	1
Cobra3 Basic Unit	12150.00	1
Power supply, 12 V-	12151.99	1
RS 232 data cable	14602.00	1
Measuring tape, $l = 2$ m	09936.00	1
Software Cobra3 universal recorder	14504.61	1
Connecting cord, $l = 50$ cm, yellow	07361.02	4
PC, Windows® 95 or higher		

**Complete Equipment Set, Manual on CD-ROM included**  
**Diffraction of ultrasonic waves at a pin hole**  
**and a circular obstacle with Cobra3** P2151711



The angular distribution of the intensity of a plane ultrasonic wave diffracted by a pin-hole obstacle.

## Tasks:

1. Determine the angular distribution of an ultrasonic wave diffracted by a pin-hole and circular obstacle.
2. Compare the angular positions of the minimum intensities with the theoretical values.