

1.5.04-11 Acoustic Doppler effect with Cobra3



What you can learn about ...

- Propagation of sound waves
- Doppler shift of frequency

Principle:

If a source of sound is in motion relative to its medium of propagation, the frequency of the waves that are emitted is displaced due to the Doppler effect.

What you need:

Cobra3 Basic Unit	12150.00	1
Power supply, 12 V ₋	12151.99	1
RS232 data cable	14602.00	1
Cobra3 Timer / Counter Software	14511.61	1
Microphone with amplifier	03542.00	1
Battery, 9 V, 6 F 22 DIN 40871	07496.10	1
Function generator	13652.93	1
Electrode holder	45284.01	1
Stand tube	02060.00	1
Sound head	03524.00	1
Plug with socket and crosshole, 2	07206.01	1
Screen with plug, $l = 100$ mm	11202.03	1
Support rod, stainless steel, $l = 600$ mm	02037.00	1
Light barrier, compact	11207.20	1
Track, $l = 900$ mm	11606.00	1
Car, motor driven	11061.00	1
Attachment for car	11061.02	1
Round cell, 1.5 V, R 14 DIN 40865 (for car)	07922.01	2
Barrel base, -Pass-	02006.55	2
Right-angle clamp	02043.00	1
Support	09906.00	1
Connecting cord, $l = 10$ cm, red	07359.01	1
Connecting cord, $l = 25$ cm, 32 A, red	07360.01	1
Connecting cord, $l = 25$ cm, 32 A, blue	07360.04	1
Connecting cord, $l = 100$ cm, red	07363.01	2
Connecting cord, $l = 100$ cm, blue	07363.04	2
Connecting cord, $l = 100$ cm, yellow	07363.02	1
PC, Windows® 95 or higher		

Complete Equipment Set, Manual on CD-ROM included
Acoustic Doppler effect with Cobra3 P2150411

	Movement toward the sound source	Movement away from the sound source
v /m/s	0.162	0.157
v /m/s	0.159	0.156
v /m/s	0.158	0.157
v /m/s	0.159	0.156
Mean \bar{v} /m/s	0.160	0.157
Mean f_{measured} /Hz	16199	16184
$f_{\text{calculated}}$ /Hz	16199.6	16184.5

Table

Tasks:

The frequency changes are measured and analysed for different relative velocities of source and observer.