

## Induction impulse 4.4.12-11



What you can learn about ...

- Law of induction
- Magnetic flux
- Maxwell's equations

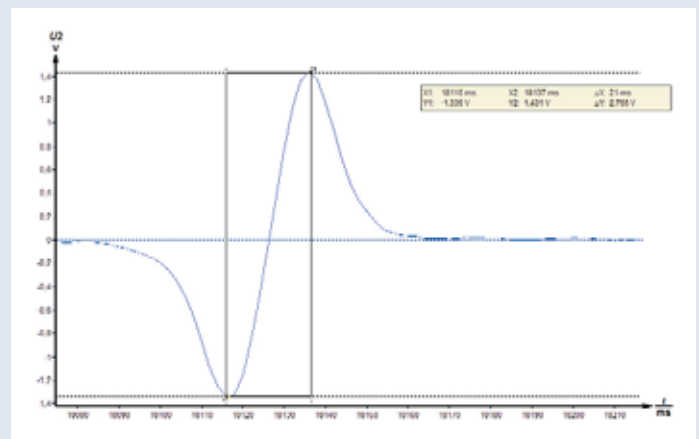
#### Principle:

A permanent magnet falls with different velocities through a coil. The change in the magnetic flux  $\Phi$  generates an induced voltage impulse. The induced voltage impulse  $U_{SS}$  is recorded with a computer interface system. Depending on the polarity of the permanent magnet the induced voltage impulse is negative or positive.

#### What you need:

Cobra3 BASIC-UNIT	12150.00	1
Power supply 12V/2A	12151.99	1
Data cable 2 x SUB-D, plug/socket, 9 pole	14602.00	1
Software Cobra3 Universal recorder	14504.61	1
Software Cobra3 PowerGraph	14525.61	1
Light barrier, compact	11207.20	1
Support rod, stainless steel 18/8, $l = 600$ mm	02037.00	1
Bosshead	02043.00	3
Tripod base -PASS-	02002.55	1
Universal clamp	37718.00	1
Glass tubes, AR-glass, $d = 12$ mm, $l = 300$ mm	45126.01	1
Coil holder	06528.00	1
Coil, 600 turns, short	06522.01	1
Magnet, $d = 8$ mm, $l = 60$ mm	06317.00	1
Connecting cable, 4 mm plug, 32 A, red, $l = 50$ cm	07361.01	2
Connecting cable, 4 mm plug, 32 A, blue, $l = 50$ cm	07361.04	2
Connecting cable, 4 mm plug, 32 A, yellow, $l = 50$ cm	07361.02	2
PC, Windows® 95 or higher		

**Complete Equipment Set, Manual on CD-ROM included**  
**Induction impulse P2441211**



Measured induction voltage  $U_{SS}$  versus time. Additionally the evaluation of the peak-to-peak voltage  $U_{SS} = 2.766$  V is shown.

#### Tasks:

1. Measurement of the induced voltage impulse  $U_{SS}$  and the falling magnet's velocity.
2. Evaluation of the induced voltage impulse  $U_{SS}$  as a function of the magnet's velocity.
3. Calculation of the magnetic flux induced by the falling magnet as a function of the magnet's velocity.