KERR EFFECT
Mod. F-KERR/EV

DESCRIPTION

Kerr effect is a phenomenon occurring in almost all isotropic transparent substances when they are under the influence of a magnetic field: in this case, they suffer a variation of their optical properties and become birefringent. This behaviour is like that of a single-axed crystal with optical axis parallel to the electric field.

A typical application of this effect is Kerr cell. It consists of a capacitor with dielectric placed between two crossed polarizers. If no electric field is detected across the capacitor plates, the intensity of the wave sent by the second polarizer is equal to zero. Applying a voltage will create an electric field across the capacitor plates, and a phase shift is induced on the wave. The wave will be biased elliptically at the cell output and the second polarizer will send only the component parallel to its own optical axis.

This experiment enables to assess Kerr effect in a solution of nitrobenzene. A small vessel of glass including a plate capacitor is filled with liquid. This vessel is kept between two filters arranged at 90°. In the beginning a dark field will be displayed on the screen, but after the application of an electric field, the displayed field will become clearer, because the light beam is electrically biased when crossing the birefringent liquid.

TRAINING PROGRAM

- Demonstration of Kerr effect in a solution of nitrobenzene.

TECHNICAL SPECIFICATIONS

- 1 Kerr cell for observing the birefringence of a dielectric biased in an electric field; it consists of a small glass vessel with a plate capacitor.
  - Distance between electrodes: 1 mm
  - Current outlet: 5000 Vdc
  - Dimensions: 50 x 50 x 20 mm
- 2 polarizers / analyzers used to output a linearly biased light; mounted on a support with rod
  - Angle: variable from 0° to 90°
  - Rod: diameter of 10 mm
- 1 LED light source with power supply
- 1 bottle of 500 ml of nitrobenzene
- 1 projection screen
- 1 high-voltage power supply (0-5 k Vdc)
  - Input voltage (AC): 230 V, ± 10%, 50 Hz
  - Output voltage: 0-5 kVdc
  - Display: 3.5 digits, LED type
  - Short-circuit current: 2 mA (max.)
- Optical bench of 1 m
- Convex lenses on lens holder
- 7 sliding supports for optical bench
- Filters of monochromatic light of several spectral ranges:

Colour	**Transmission band** (nm)
- Red	> 635
- Yellow	560 - 595
- Yellow-green	510 - 570
- Blue and purple	405 - 470

- Red and black flexible cables

SUPPLIED WITH
THEORETICAL - EXPERIMENTAL HANDBOOK

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