

Laser Electro-Optic Effect



General Aim

Study the electro-optic effect in some crystals.

Method

Kerr Cell Procedure

Learning Objectives (ILOs)

- Explain the electro-optic effect in a Lithium Niobate crystal.
- Set up an experiment to study the electro-optic effect in crystals
- Determine the half-voltage value of electro-optic crystals.

Theoretical Background/Context

Monochromatic polarized light (laser) is incident on Lithium niobate crystal that is placed at 45° with the vertical. Applying an electric field to the crystal, causes it to become birefringent. The phase shift between the ordinary and the extraordinary light is found to depend on the square of the electric field.

Principle of Work

Lithium niobate crystal is illuminated with a laser beam that is polarized to 45° with the vertical. An electric field is applied to the crystal, which allows some light to come out of the crystal and is detected by photo-sensor. The amount of light passing through the crystal is recorded as a function of the electric field using a photosensor, and the half voltage value is determined.