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جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

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Benha University
Faculty of Science
Physics Department



Studies And Applications On The Birefringence Phenomenon

٢٠٢٠

A THESIS

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(PHYSICS)

BY

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Abstract

Abstract

The energy and information content carried by an optical beam can split into two optical paths when the beam transmitted through a birefringent crystal corresponding in general to two different components: the ordinary and extraordinary directions. Assuming a uniaxial crystal with its optic axis oblique to the surface of incidence, the directions of refraction are distinct. Therefore, an object placed in front of the crystal when imaged through an optical system results in two shifted images.

Optical polymers and liquid crystals which exhibit birefringence have been widely used in industrial and research applications as key materials for various optical devices such as lenses and functional films for liquid crystal displays (LCDs).

In the first chapter, a general introduction was introduced about the phenomena of birefringence, speckle photography and liquid crystal material. After that the previous work that appeared in these fields were mentioned. Aim of the work had been identified at the end of the chapter.

In the second chapter, the values of birefringence and dispersion for quartz, calcite crystals and Fortepan photographic plate were measured by using advanced techniques of speckle photography and two beam interferometry. The values of birefringence for these samples were measured and compared with another polarizing method depending on the intensity of incident and transmitted light from the sample.