How to explain the conoscopic figures

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Liquid crystals are widely used and have unique optical properties, due to their anisotropic structures. They are birefringent and one of their most important properties is the optical indicatrix. An optical technique to measure the indicatrix is a conoscopy [1-3]. The method is quite complex for understanding, but it is usually used as a recipe type of a measurement.

For using a specific method it is always welcome, if one is familiar with its physical background. Therefore we developed the set of experiments appropriate for optics laboratory, which later allow for understanding of conoscopic figures and their interpretations.

As a part of the symposium we present the sequence of experiments, which discuss in detail various sample properties affecting the conoscopic figure. We use different anisotropic materials (uniaxial and biaxial) of different thicknesses and different light sources (monochromatic and white light). The experiences gained in this introductory set of experiments are than used to experimentally consider the effect of the external electric field on the liquid crystal in the cell, as an example.

[1] Berry, M., R. Bhandari, and S. Klein, Eur. J. Phys. 20 (1999). [2] Perkalskis, B., S., Am. J. Phys. ,78 , 2010. [3] Perkalskis, B., S., Am. J. Phys. ,61, 1993.

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