CONICAL REFRACTION, PHENOMENON AND APPLICATIONS

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In 1832 Hamilton predicted conical refraction, concluding that if a beam propagates along an optic axis of a biaxial crystal, a hollow cone of light will emerge giving rise to characteristic CR ring (fig 1). Every point from the ring has unique linear polarization state and two opposite points are orthogonally polarized. After nearly two centuries on, we restarted investigation of this unique phenomenon. In this paper we will review CR phenomenon and it potential for practical use. We will present potential applications of CR in laser physics and biophotonics trapping. We believe that our research are of paramount importance in the field of photonics, especially since conical refraction has traditionally been considered as "little more than a curious optical phenomenon which had no conceivable application".
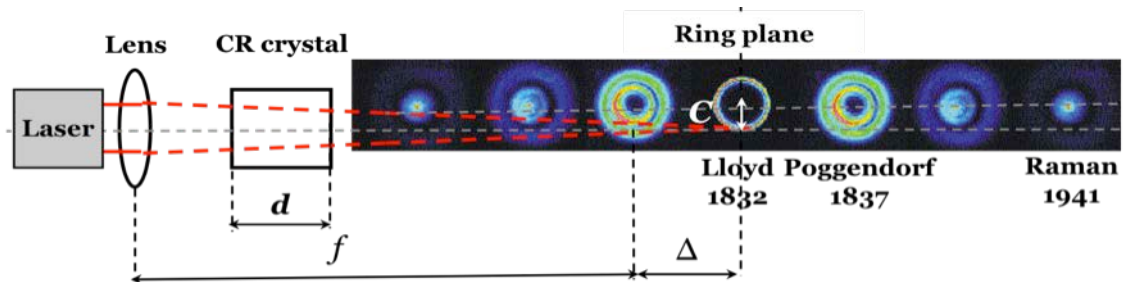

Fig. 1. Schematic diagram showing spatial evolution of a Gaussian beam in free space after its propagation through the CR crystal.