FOURIER TRANSFORM JONES MATRIX APPROACH FOR POLARIZED STRUCTURED LIGHT

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This work presents a study of the diffraction patterns obtained with vectorial fields with spatially variant transverse profiles that propagate within the classical paraxial domain. The Fourier transform Jones (FTJ) matrix [1] is applied to handle simple meaningful examples including patterned polarizers are retarders. In combination with the beam coherence polarization (BCP) matrix [2], the method is extended to include illumination unpolarized light [3]. The figure below one simple example proposed by Gori et al [4] consisting in a rectangular aperture with crossed polarizers on each half. Figure 1(b) shows the horizontal profile of the irradiance of the diffraction pattern obtained when illuminated with uniform linear diagonal polarization (black curve), and the variation of the polarization state, as well as the irradiance profile when a diagonal or antidiagonal analyzers are included in the system. Other examples of vectorial diffractive elements will be presented as well, including polarization diffraction gratings generating vector and scalar vortex beams carrying orbital angular momentum (OAM) [5].

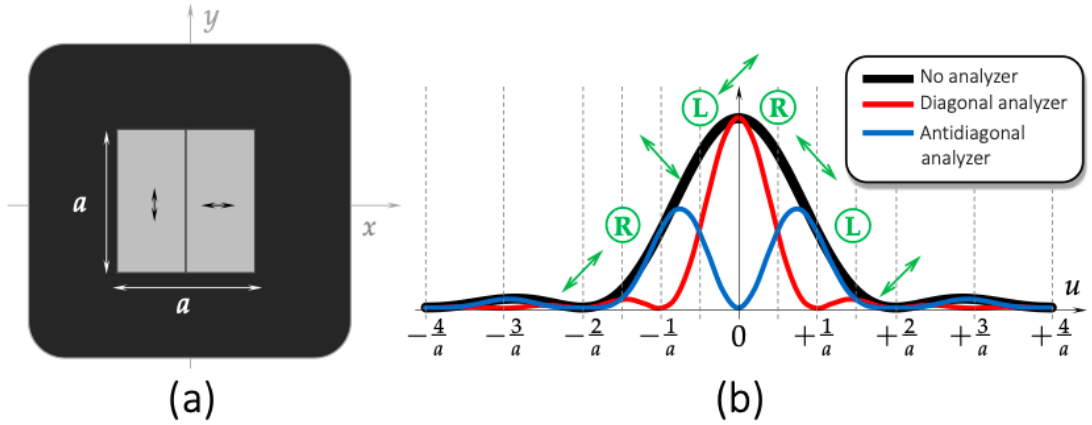

Fig. 1: (a) Diffractive element consisting in a square aperture with two orthogonal linear polarizers in each half. (b) Horizontal profile of the diffracted field when illuminated with a plane wave with uniform diagonal linear polarization.

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