INVESTIGATION OF POLARIZATION SINGULARITIES AND TOPOLOGY OF VECTOR LIGHT FIELDS

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S u m m a r y

Vector (elliptic) light fields with complicated topology possess a specific set singularities (circularly polarized *C* points and *L* lines with linear polarization changing its azimuth from point to point). Due to this, the stationary amplitude zeros are absent as a gainst to the phase singularities of scalar light fields (optical vortices, etc.) with zero-amplitude at singular points and on singular lines where the phase is indefinite [1, 5]. *C* points possess the topological index equal to $\pm 1/2$ describing the pattern of surrounding ellipses. In elliptic light field, the distributions over the azimuth of a major axis and the formfactor (the ratio of the minor and major axes of an ellipse) have also critical points (extrema and saddles) [9]. All the considered features of the complicated topological structure (vector field skeleton) are realized typically on small scales, up to the micrometer size. Therefore, it can be measured only by a precise technique with high amplitude and space resolution. We have elaborated the corresponding method based on the precise measurement of the Stokes parameters which fully describe elliptic fields with arbitrary polarization structure [14] and Stokes vortices calculated from these data with a computer [9]. As a demonstrative example, the skeleton of speckle fields after multimode fibers was defined. The results are in good agreement with theoretical predictions. The developed technique based on the use of a high-resolution CCD camera together with a computer equipped by a package of special programs can be recommended to a wide use for the investigation of elliptic light fields with arbitrary complicated topological structure which is realized in the most part of actual experimental situations.