Rapid fabrication of spiral varying retarder for generating radial and azimuthal vector optical fields

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Considerable attention is paid to the creation of annular beams with radial and azimuthal polarization. A simple, reliable and efficient technology for manufacturing a spiral variable retarder (SVR) on Icelandic spar for generating radially and azimuthally polarized beams from a linearly polarized Gaussian beam with a length of 1.064 microns is shown. SVR with a diameter of 8 mm, consisting of 20 sectors, was obtained by laser-induced microplasma treatment. When the SVR is placed between two quarter-wave plates with orthogonal fast axes, typical figures of the intensity distribution in the far field are recorded in four positions of the analyzer (0, 45, 90, 135). The ability of SVR to generate a vector optical field with radial polarization has been confirmed. It was also shown that the rotation of the linear polarizer by 90 makes it possible to create an azimuthally polarized vector optical field.