Abstracts

Field in Single-Mode Helically-Wound Optical Fibers

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The scalar field wave equations of the fundamental mode in single-mode helically-wound optical fibers with circular cross section are obtained by using the Maxwell equations in the local orthogonal curvilinear coordinate system introduced by Tang. Two important results are brought about 1) The field in the above-mentioned fibers maintains a quasi-linear state of polarization while its orientation rotates with a rotation rate close to - tau with respect to the Serret-Frenet frame. 2) The state of polarization (SOP) of the above field changes periodically along the propagation distances from 1 to a value a little less than 1, and, for a fixed s, it changes periodically according to the incident polarized angles with a period/spl pi//2. The theoretical results have been verified by the experimental measurements.

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