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Two-to-Four Coherent Beams Interference Patterns of Non-Orthogonal Planes

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Abstract: In this paper, we present an analysis of intensity distribution of interference pattern of two-to-four linearly polarized plane waves at their intersection in a plane surface. A configuration in which the four plane waves intersect at different angles along four non-orthogonal planes is considered. We show that the shape and the intensity distribution of the interference pattern is strong function of the angles of planes, kinds of polarizations, beam incidence angles. A variety of two-dimensional intensity distribution arrays have been formed by two-to-four beams with differing plane angles, angles of beam incidence and beam polarizations, which may potentially be useful in forming arrays of submicron structures in thin films. We also give a few experimental examples in Co-Pt and Co/SiO_x multilayer thin films.

Key Words: Lasers, interference patterning, arrays, multilayers, thin films

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