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Helical lights twist materials to form chiral structures　-Chiral Photonics-

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Helical lights, *i.e.*, optical vortices with helical wavefronts and circularly polarized lights with helical electric field, widely investigated in optical tweezers, super-resolution microscopes, and optical communications, carry an orbital angular momentum owing to a phase singularity. In recent years, we and our-coworkers have discovered that their orbital angular momentum allows us to twist materials to form chiral structures on a nano-scale, where the constituent elements (melted or vaporized material) of the irradiated material receive the helicity of optical vortices, thereby forming chiral nanostructures [1-5]. Such phenomenon will enable us to provide new physical insight into laser-pioneered materials science including chiral plasmonics, chiral metamaterials as well as novel nanoscale imaging technologies for selective identification of the chirality of molecules and chemical composites. This is termed ‘Chiral Photontics’.

In this presentation, we review a recent progress concerning chiral nano-structures fabricated by optical vortex lasers, including the chiral mono-crystalline Si nano-cones formation as well as the chiral surface relief formation in an azo-polymer film. We also address a state-of the art of the vortex laser technologies [6-8].

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