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Angular momentum conversion of light in laser-plasma interaction[1] CHEN-KANG HUANG, CHAOJIE ZHANG, KEN MARSH, CHRIS CLAYTON, CHAN JOSHI, University of California, Los Angeles — It is well-known the spin angular momentum of light is associated with the polarization of the light. During the laser-plasma interaction by a circularly polarized pump laser, the angular momentum from the pump beam can transfer to the plasma or radiations generated in the plasma. In this work, the angular momentum properties of nonlinear harmonic generation by an intense laser in plasmas have been studied. Even harmonics are excited when plasmas have transverse density gradients produced either by ponderomotive force of the laser or in the boundary region of an optical-field ionized (OFI) plasma. We experimentally observe the conversion of spin to orbital angular momentum by measuring the twisted wavefront of the second harmonic light generated from an OFI helium plasma produced by an intense circularly polarized pulse.

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