Abstract Submitted
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Topological charge algebra of optical vortices in nonlinear interactions[1] MARIIA SHUTOVA, ALEXANDRA ZHDANOVA, Texas AM Univ, AYSAN BAHARI, None, MIAOCHAN ZHI, NIST, ALEXEI SOKOLOV, Texas AM Univ — Optical vortices find their use in multiple areas of research and technology; in particular, they provide an opportunity to generate short-pulse spatially-structured optical beams, which can be used to study ultrafast processes. In our work, we explore interactions of femtosecond optical vortices in nonlinear crystals. We investigate the transfer of orbital angular momentum among multiple (applied and generated) beams involved in a coherent Raman interaction. We use a liquid crystal light modulator to shape the applied pump and Stokes beams into optical vortices with various integer values of topological charge, and cross them in a Raman-active crystal to produce multiple Stokes and anti-Stokes sidebands. We then examine the transfer of optical angular momentum into each sideband and find that it follows a certain law that can be derived from angular momentum conservation for created and annihilated photons, or equivalently, from phase-matching considerations for the interacting beams.

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