Abstract Submitted
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Femtosecond optical vortices and transfer of OAM algebra in nonlinear interactions.[1] MARIIA SHUTOVA, ALEXANDRA ZHDANOVA, Texas AM University, AYSAN BAHARI, None, MIAOCHAN ZHI, NIST, ALEXEI SOKOLOV, Texas AM University — Optical vortices (OV) are of great interest to our group because they provide an opportunity to generate ultrashort spatially-structured optical beams, which can be used to study ultrafast, biological processes, as in STED microscopy. We will present results from our investigation of the interaction of femtosecond optical vortices with nonlinear crystals and the corresponding transfer of orbital angular momentum (OAM) through this interaction. In our experimental setup, an approximately linearly chirped pulse is split into pump and Stokes pulses and recombined at a nonlinear crystal with a relative time delay, interacting in a cascaded Raman process and producing Raman sidebands. We shape the originally Gaussian pump and Stokes beams into vortices using a spatial light modulator, allowing us to easily control the OAM of each beam and generate OV sidebands. We then examine the OAM transfer 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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