Nonlinear Mixing of Optical Vortices with Fractional Topological Charges in Raman Sideband Generation.[1] JAMES STROHABER, Florida Agricultural and Mechanical University, YAKUP BORAN, MUHAMMED SAYRAC, Texas Agricultural and Mechanical University, LEWIS JOHNSON, Florida Agricultural and Mechanical University, FENG ZHU, ALEXANDRE KOLOMENSKII, HANS SCHUESSLER, Texas Agricultural and Mechanical University — We studied the nonlinear parametric interaction of femtosecond fractionally-charged optical vortices in a Raman-active medium. Propagation of such beams is described using the Kirchhoff-Fresnel integrals by embedding a non-integer 2pi phase step in a Gaussian beam profile. When using fractionally-charged pump or Stokes beams, we observed the production of new topological charge and phase discontinuities in the Raman field. These newly generated fractionally-charged Raman vortex beams were found to follow the same orbital angular momentum algebra derived by [Strohaber et al., Opt. Lett. 37, 3411 (2012)] for integer vortex beams.

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