

Abstract Submitted
for the PSF15 Meeting of
The American Physical Society

Molecular modulation and the coherent transfer of optical orbital angular momentum in femtosecond radiation. JAMES STROHABER, Florida AM University, SASHA KOLOMENSKII, HANS SCHUESSLER, Texas AM University — We investigate the nonlinear parametric interaction of optical radiation in various transverse modes in a Raman-active medium. Our pioneering work has allowed us to take a next step in molecular modulation by including optical orbital angular momentum. We have verified the orbital angular momentum algebra (OAM-algebra) derived by [Strohhaber et al., *Opt. Lett.* 37, 3411 (2012)] to hold for higher-order Laguerre Gaussian modes. This same algebra was also found to describe the coherent transfer of OAM when Ince-Gaussian modes were used. New theoretical considerations extend the OAM-algebra to even and odd Laguerre Gaussian, and Hermite Gaussian modes. The results of this novel research are relevant to the spatiotemporal synthesis of custom sub-femtosecond pulse.

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Date submitted: 21 Oct 2015

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