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**Femtosecond Optical Vortex** IGOR MARIYENKO, CHAD PETERSEN, JAMES STROHABER, CORNELIS UITERWAAL, University of Nebraska - Lincoln — Given that the rescattering ionization probability is influenced by the polarization of the radiation (which is related to spin angular momentum), we have set out to investigate similar effects of optical Orbital Angular Momentum. It is well-known that Optical Vortices possess Orbital Angular Momentum. In units of $\hbar$ its value per one photon is equal to the topological charge of the vortex, i.e. any integer number [1]. A number of methods to produce optical vortices in monochromatic laser beams are already established (see [2], and refs. therein). Unfortunately, none of these is suitable for broadband laser radiation like femtosecond pulses. We present a method to create Optical Vortices in a femtosecond laser beam. Our setup utilizes a thin phase hologram to produce a doughnut Optical Vortex. Currently, we are extending our technique to make it suitable for use in high-energy femtosecond pulses; at the conference we expect to present results on a high-intensity Optical Vortex. (Separate poster contributions discuss rescattering and our ion detection technique).

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[1] L. Allen *et al.*, *Phys. Rev. A* **45,** 81 (1992); [2] M. Vasnetsov and K. Staliunas (Ed.), *Optical Vortices* (Nova Science, NY, 1999)

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