An optical vortex is a singularity point in a (scalar) electric field where the amplitude vanishes and the phase is undetermined. Laguerre-Gaussian modes are examples of modes containing an optical vortex. Our interest in vortex modes stems from the fact that their photons possess optical orbital angular momentum (OAM). Our goal is to make strong ultrashort pulses with a vortex, so we can study the influence of optical OAM on intense-field ionization. Our motivation is the role of the photon’s spin angular momentum: in its manifestation as polarization, this affects intense-field ionization. Notable are electron recollision processes, central to many schemes to generate attosecond pulses. What role optical orbital angular momentum plays in intense-field processes is to the best of our knowledge experimentally unexplored territory. In 2005, we were the first to report the generation of a pure femtosecond vortex. Our setup uses holographic diffraction and properly deals with bandwidth (tens of nm). We now use a programmable hologram. We are currently increasing the intensity of our fs vortices to reach ionization levels so we can image focused vortices with our spatially-resolved ion detector. Recent progress will be discussed. Refs: ²Allen L et al. 2003 Optical Angular Momentum (Bristol: IoP Publ.); ³Marienko I et al. 2005 Opt. Expr. 13 7599; ⁴Strohaber J et al. 2006 J. Phys B. subm.

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