Abstract Submitted
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Effects of Molecular Alignment on High Harmonic Generation from N_2 in a Hollow-Core Waveguide BRETT SICKMILLER, ROBERT JONES, Department of Physics, University of Virginia — We have studied high harmonic generation (HHG) from laser aligned N_2molecules in a hollow-core waveguide. In the experiments, a Michelson interferometer splits a single 30 fsec 790 nm laser pulse into two time-delayed laser pulses which are then focused into a N_2 filled glass capillary tube [1]. First, the "alignment" pulse drives a sequence of Raman transitions within each N_2molecule, creating a rotational wavepacket whose temporal evolution results in the periodic alignment of the molecular axis parallel (or perpendicular) to the laser polarization axis [2]. We measure the 15^{th} – 25^{th} harmonics produced by the transiently aligned molecules using the second, "signal" laser pulse. The relative angle between the signal pulse polarization and the molecular axis is varied by changing the pulse delay or by rotating the polarization of the alignment pulse in the interferometer. We observe variations in the individual harmonic signals of up to a factor of 3 for parallel as compared to perpendicularly aligned targets. In addition, we are exploring the effects of laser-chirp and ellipticity on the HHG yield in an attempt to provide additional information regarding non-perturbative molecular dynamics in the presence of intense laser fields. This work is supported by DOE BES and the UVa FEST. [1] A. Rundquist *et al.*, Science **280**, 1412 (1998). [2] F. Rosca-Pruna and M.J.J. Vrakking, Phys. Rev. Lett. **87**, 153902 (2001).

Robert Jones
Department of Physics, University of Virginia

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