Abstract Submitted
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**Characterization of Bessel-Gauss beams for applications to high harmonic generation**[1] ADAM SUMMERS, JAN TROSS, J. R. Macdonald Lab., Kansas State University, XIAOMING YU, CREOL, The College of Optics and Photonics, University of Central Florida, XINYA WANG, SHUTING LEI, Department of Industrial and Manufacturing Systems Engineering, Kansas State University, CARLOS TRALLERO-HERRERO, Department of Physics, University of Connecticut — Beams with a Bessel-Gaussian profile have a series of attractive properties for use with High Harmonic Generation (HHG). This includes the ability to overcome limitations typically associated with the Rayleigh range of standard Gaussian beams. In this work we demonstrate that by using a shallow angle axicon, in conjunction with a spherical lens, it is possible to generate tight focal spot sizes while maintaining a long effective focal length. The shallow focusing profile of the setup, combined with a smaller spot size can lead to extremely long phase matching lengths, while still achieving high focal intensities. Additionally, Bessel-Gauss beams develop into a so called "donut mode" in the far field allowing for the fundamental beam to be easily separated from the generated harmonics without the use of any filters. The relationship between ionization and harmonic generation in a Bessel-like beam is explored by scanning an Ar gas jet though the on-axis focal profile while measuring the harmonic spectrum and ionization rate in unison. These results point to the potential of using an axicon-lens combination to create a compact, table-top, high-flux XUV source..

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