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Direct Observation of Laser Filamentation in High-Order Harmonic Generation GAVIN GIRAUD, JOHN PAINTER, NICOLE BRIMHALL, MARK ADAMS, NATHAN POWERS, ERIC CHRISTIANSEN, MATT TURNER, MICHAEL WARE, JUSTIN PEATROSS, Brigham Young University — We investigate the spatial evolution of a laser pulse used to generate high-order harmonics (orders ranging from 45-91) in a semi-infinite helium-filled gas cell. The 5 mJ, 30 fs laser pulses experience elongated focusing with two distinct waists when focused with f/125 optics in 80 torr of helium. An extended phase matching for the generation of harmonics occurs in the region between the double foci of the laser, where the laser beam changes from diverging to converging.

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