

Abstract Submitted
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Optical Guiding and Electron Acceleration in Programmably Modulated Plasma Waveguides¹ GEORGE HINE, ANDREW GOERS, JENNIFER ELLE, LINUS FEDER, HOWARD MILCHBERG, Institute for Research in Electronics and Applied Physics, University of Maryland, College Park — We demonstrate the guiding of relativistically intense laser pulses through programmably structured plasma waveguides. The structure of the waveguide is dictated electronically using a Spatial Light Modulator(SLM). The waveguides are generated by sending a radially patterned intense laser pulse through an axicon in a clustered gas medium, efficiently ionizing and heating a column of plasma which expands to form an optical guiding structure. Intensity modulations at the line focus produce density modulations as the waveguide evolves. Patterning of the intense laser pulse is achieved using the SLM in an interferometric configuration. This SLM patterning technique allows for *in situ* sculpting of waveguides with arbitrary density structures. Density ramps are generated for electron injection, and periodic structures are formed to quasi-phasesmatch laser wakefield acceleration and direct laser acceleration.

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