

Abstract Submitted  
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**Propagation of high power, quasi-radially polarized TEM<sub>01</sub> modes in a plasma waveguide**<sup>1</sup> ANDREW GOERS, GEORGE HINE, JENNIFER ELLE, LINUS FEDER, HOWARD MILCHBERG, University of Maryland, College Park — The longitudinal electric field of a tightly focused radially polarized laser pulse has been proposed and investigated as a compact means of accelerating femtosecond scale electron bunches. However, generation of high power, short pulse lasers with radial polarization has presented a significant technical challenge. We present a simple method of generating quasi-radial polarization by creating a pi-phase delay between two halves of a linearly polarized laser. When focused, the quasi-radially polarized pulse creates an approximately TEM<sub>01</sub> mode. We investigate guiding of the TEM<sub>01</sub> mode in a plasma waveguide over a range of intensities approaching  $a_0 = 1$ .

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