Propagation of high power, quasi-radially polarized TEM\(_{01}\) modes in a plasma waveguide\(^1\) 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\(_{01}\) mode. We investigate guiding of the TEM\(_{01}\) mode in a plasma waveguide over a range of intensities approaching \(a_0 = 1\).

\(^1\)This work is supported by DTRA and DOE.