

Abstract Submitted  
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**High efficiency electron injection for plasma accelerators using higher-order laser modes**<sup>1</sup> P. MICHEL, E. ESAREY, C. SCHROEDER, B. SHADWICK, W. LEEMANS, LBNL — Using higher-order transverse laser modes for plasma wakefield excitation, and, in particular, using a ring profile with maximum intensity off-axis, results in shifting the focusing and defocusing phase regions of the plasma wave in a wakefield accelerator.<sup>2</sup> This results in improved performance of electron injection schemes. It is shown that using higher-order modes for wakefield excitation results in a significant decrease in the trapping threshold required for optical injection of electrons and an increase in the maximum energy gain of the trapped electrons. This scheme could also be of interest for the generation of ring electron beams or for beam conditioning purposes.

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<sup>2</sup>P. Michel et al., submitted (2006)

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