Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Geometrical Optimization of a Cylindrical Plasma Lens BRIAN NEISWANDER, ERIC MATLIS, THOMAS CORKE, University of Notre Dame — Previous work by the authors have demonstrated the concept of an AC "plasma lens" for optical path difference (OPD) control of laser wavefronts. Plasma lenses feature no moving parts and a high frequency response, both of which are highly favorable for adaptive optics. This work investigates the geometrical constraints the plasma lens design, particularly the influence of the diameter of electrodes and gap distance between electrodes. A simplified electrostatic model for the plasma lens is developed and compared with experimental results. A good agreement is found between the experiments and theory. In regard to plasma lens design, the findings indicate (1) that there exists a critical gap-distance-to-diameter ratio, and (2) that the spatial efficiency of the device depends highly on the gap-distance-to-diameter ratio.

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Date submitted: 03 Aug 2011 Electronic form version 1.4