

Abstract Submitted
for the MAS16 Meeting of
The American Physical Society

External Focusing Effects on Filament Formation in Air AMELIA HANKLA, MATTHEW EDWARDS, JULIA MIKHAILOVA, Princeton University — Self-focusing of high power laser beams occurs when non-linear focusing due to the optical Kerr effect overcomes diffraction. A threshold power for self-focusing (3.2 GW in air) can be estimated analytically; beam powers slightly above this threshold result in the formation of a single filament. This work characterizes the filamentary behavior of an 85-femtosecond, 3.9-mJ peak power laser beam in air, with particular emphasis on the beams critical power and conical emission, to validate computations using a solver for the non-paraxial unidirectional pulse propagation equation and to distinguish the roles of self-focusing and external-focusing. Simulations are extended to consider the effect of gas pressure on the development of multiple filaments in beams with powers up to 20 TW.

Amelia Hankla
Princeton University

Date submitted: 16 Sep 2016

Electronic form version 1.4