1016-78-61 **Pavel M. Lushnikov***, University of Notre Dame, Department of Mathematics, 255 Hurley Hall, Notre Dame, IN 46556, and **Harvey A. Rose**, Los Alamos National Laboratory, Theoretical Division, MS-B213, Los Alamos, NM 87545. *How much laser power can propagate through fusion plasma?*

Propagation of intense laser beams in plasma is crucial for inertial confinement fusion (ICF) which requires precise beam control in order to maintain symmetry of spherical target implosion, and so achieve the compression and heating necessary to ignite the fusion reaction. Control of intense beam propagation may be ruined by laser beam self-focusing, when a beam digs a cavity in plasma, trapping itself, leading to higher beam intensity, a deeper cavity, and so on. Our primary result is the identification of the maximum laser beam power that can propagate through fusion plasma without significant self-focusing. We find excellent agreement with recent experimental data, and suggest a way to increase that maximum by appropriate choice of plasma composition that affects acoustic damping and thermal transport in plasma. The National Ignition Facility (NIF), where ICF will be attempted, is now under construction. Our theory has immediate implication for NIF designs. (Received January 25, 2006)