Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Mitigation of Laser Plasma Instabilities in Hohlraum Targets[1]
WILLIAM KRUER, University of California, Davis, PETER AMENDT, SCOTT WILKS, DONALD MEEKER, NATHAN MEEZAN, LARRY SUTER, Lawrence Livermore National Laboratory — Additional techniques to control laser plasma instabilities would enlarge the parameter space for ignition target designs on the National Ignition Facility. A possibility recently suggested [1] is to engineer coherence disruptions in NIF hohlraums, say, by modulations in the liner composition or by manipulation of the plasma flow. Hohlraum simulations using striped liners look promising. We also explore other effects leading to instability mitigation, including re-absorption of Raman-scattered light, instability gain reduction by strong refraction of the Raman-scattered light in transverse density gradients, and preheat reduction associated with a diminishment of the Raman-heated electron distribution function beyond an energy of about 4-5 times the hot electron temperature. Finally we note that it is also important to minimize seeding the laser-driven instabilities, which can happen in various ways, and to avoid intensity enhancement due to focusing of laser light by transverse density gradients in the hohlraum.
[1] William L. Kruer, et. al., UCRL-SR-220853 (2005)

[1]This work was performed under the auspicies of the U.S. Department of Energy by the University of California Lawrence Livermore National Laboratory under Contract No. W-7405-Eng-48

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Date submitted: 31 Jul 2006 Electronic form version 1.4