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Self-consistent treatment of energy redirection due to laser plasma instabilities[1] M.M. MARINAK, G.D. KERBEL, P. MICHEL, L. DIVOL, Lawrence Livermore National Laboratory — The flow of laser energy in National Ignition Facility (NIF) hohlraums is substantially affected by energy transfer between crossing laser beams and by backscatter of laser light due to laser plasma instabilities. We present an integrated HYDRA simulation of a NIF ignition hohlraum which includes a self-consistent inline treatment of energy redirection due to these effects. The simulation utilizes a linear model[2] for energy transfer in crossed beams. It also includes empirical models for stimulated Raman scattering (SRS) and stimulated Brillouin scattering (SBS). Suprathermal electrons generated by the SRS can be transported using a non-local electron transport model. We also examine the effect of plasma heating by the ion acoustic wave which mediates the cross beam transfer. For example consider laser energy that is transferred between laser beams, then backscattered by SRS. The red-shifted light is partially reabsorbed in the plasma while propagating out of the hohlraum. The simulation includes the resulting effects on energy and momentum deposition.

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[2]P. Michel et. al, Phys. Plasmas 17, 056305 (2010).

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