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Three-dimensional steady-state analysis of laser-plasma instabilities in NIF hohlraum designs PIERRE MICHEL, LAURENT DIVOL, ED WILLIAMS, JOHN PALASTRO, DEBBIE CALLAHAN, LARRY SUTER, LLNL — We have developed a three-dimensional steady-state model, SLIP, that can analyze various laser-plasma instabilities (LPI) such as Stimulated Brillouin and Raman scattering, cross-beam energy transfer and cross-beam backscattering enhancement. The electromagnetic waves are modeled with a paraxial approximation, and the laser field is initialized with the electric fields measured on NIF. The plasma waves are described in the linear kinetic regime. Our model includes both Thomson and blackbody noise sources. This tool allows modeling of the propagation of full-scale NIF laser beams over very large volumes (tens of mm^3), and can assess several important LPI issues in realistic conditions. We will present an application of our model for a detailed analysis of various LPI effects in the most current NIF hohlraum design. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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