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Mitigation of Stimulated Raman Scattering in Hohlraum Plasmas[1] D.S. MONTGOMERY, J.L. KLINE, H.A. ROSE, S.R. GOLDMAN, LANL, D.H. FROULA, J.S. ROSS, LLNL, R.M. STEVENSON, AWE — One aspect of the research at LANL to control Stimulated Raman Scattering (SRS) in hohlraum plasmas is the investigation of risk mitigation strategies for indirect drive inertial confinement fusion. Beam spray of the laser, due to thermally-enhanced forward Brillouin scattering, results in a decrease in the longitudinal coherence lengths of the laser, which in turn reduces SRS. Since thermal effects depend on Z^2, a small amount of a high Z dopant, 1-2%, can have a large effect. Experiments have been conducted at the Omega laser to test this theory by varying the amount of Xe dopant in C_5H_{12} gas filled hohlraums, and do show a decrease in SRS backscatter as Xe dopant is added. However, there are still uncertainties regarding the responsible mechanism. The second strategy investigated is using high $k\lambda_D$ plasmas to reduce SRS backscatter. Experiments conducted at the Omega laser in hohlraum plasmas determined the critical onset intensity for a range of $k\lambda_D$. A scaling of the critical onset intensity as a function of $k\lambda_D$ has been determined. The scaling is compared with theoretical predictions. Results for both mitigation strategies will be presented, as well as suggested implementation strategies for ignition-relevant hohlraums.

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