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Stimulated Raman scatter analyses of experiments conducted at the National Ignition Facility[1]

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The recent energetics campaign[2] conducted at the National Ignition Facility in Fall, 2009 achieved its two main goals: providing radiation drive and symmetry suitable for subsequent ignition experiments. Many diagnostics were fielded during this campaign, one of which provided a time-resolved wavelength spectrum of light reflected from the target by stimulated Raman scatter (SRS). SRS occurs when incident light reflects off self-generated electron plasma waves. The SRS spectrum of an inner cone quad has provided insight into these experiments. Analyses indicate that synthetic SRS diagnostics better match those of experiments when an atomic physics model with greater emissivity is utilized, along with less inhibited electron transport (higher flux, with, ideally, nonlocal electron transport). With these models,[3] SRS primarily occurs in a region of the target where nearest-neighbor 23° quads significantly overlap the diagnosed 30° quad. This increases the gain at lower density (lower wavelength), a feature consistent with experimental results. Other predicted features, such as the direction and spreading of the SRS as well as its intensity, are also in better agreement with experiment. Inclusion of this effect of multiple beams sharing a reflected SRS light wave has resulted in modifications to our laser-plasma interaction codes.[4,5,6] These improved capabilities are being tested by making predictions for upcoming National Ignition Campaign experiments. Synthetic SRS spectra, reflectivity levels, and the angular distribution of SRS light will be compared to experimental results.

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[2]N. B. Meezan *et al.*, Phys. Plasmas **17**, 056304 (2010).

[3]M. D. Rosen, this conference.

[4]C. H. Still, this conference.

[5]D. J. Strozzi, E. A. Williams, D. E. Hinkel *et al.*, Phys. Plasmas **15**, 102703 (2008).

[6]R. L. Berger, C. H. Still, E. A. Williams, and A. B. Langdon, Phys. Plasmas **5**, 4337 (1998); C. H. Still, R. L. Berger, A. B. Langdon, D. E. Hinkel, L. J. Suter, and E. A. Williams, Phys. Plasmas , 2023 (2000); D. E. Hinkel, D. A. Callahan, A. B. Langdon, S. H. Langer, C. H. Still, and E. A. Williams, Phys. Plasmas **15**, 056314 (2008).