

Abstract Submitted
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Control of collective FSBS and backscatter SRS through plasma composition¹ HARVEY ROSE, Los Alamos, PAVEL LUSHNIKOV, Notre Dame — Nominal NIF parameters are near the collective forward SBS (FSBS) threshold (P. M. Lushnikov and H. A. Rose, Phys. Rev. Lett. **92**, 255003 (2004), “L&R”). It will be shown that being on this instability edge can be used as a control lever: a small amount of high Z dopant may lead to qualitative change in FSBS regime at fixed laser intensity, possibly reducing backscatter instability losses (Such results have already been observed, but absent SSD, a key aspect of our theory: R. M. Stevenson et al., Phys. Plasmas **11**, 2709 (2004); L. J. Suter et al., 2738, ib.). *Ponderomotive* FSBS regimes are determined by the parameter $\tilde{I} = F^2 (v_{osc}/v_e)^2 (n_e/n_c)/\nu$, with ν the dimensionless ion acoustic damping coefficient and F the optic f/#. Analytical results will be presented which show a decrease of \tilde{I} ’s threshold value through the addition of high Z dopant to low Z plasma, owing to increased **thermal contribution** to FSBS. Alternatively, one may raise the threshold by managing the value of ν by, *e.g.*, adding He to SiO₂. For nominal NIF parameters, a range of He fraction in SiO₂ plasma is predicted to suppress backscatter SRS while maintaining control of forward SBS.

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