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Observation of amplification of a 1ps pulse by SRS of a 1 ns pulse in a plasma with conditions relevant to pulse compression ROBERT KIRKWOOD, E DEWALD, S.C. WILKS, N. MEEZAN, C. NIEMANN, L. DIVOL, R.L. BERGER, O.L. LANDEN, LLNL, J. WURTELE, A.E. CHARMAN, R. LINDBERG, UCB/LBL, N.J. FISCH, V.M. MALKIN, Princeton — We have observed the amplification of a 1 ps, 1200 nm, probe pulse when counter propagating with a 1ns, 1 x 10^{15} W/cm^2, 1064 nm pump pulse, in a He gas plasma created by the pump. When the gas and plasma density is adjusted to match the resonance condition for the probe to seed the stimulated Raman scattering (SRS) of the pump ($\sim$ 1 x 10^{19} e/cm^3) the transmitted probe energy is enhanced by 20x to 30x its value off resonance, and as much as 4 mJ of energy is transferred. This is the first demonstration that a 1ns pump beam can significantly amplify an ultra short pulse by SRS in a plasma that can survive irradiation by the pump, and is therefore attractive for compression of the pump when the interaction length is increased. Experiments both at reduced pump intensity, and with an 1124 nm wavelength probe interacting in a 2.5 x 10^{18} e/ cm^3 plasma, show a strong scaling of amplification with the resonant density and probe wavelength, and a weaker scaling with pump intensity. This work was performed under the auspices of the U.S. Department of Energy by Univ. of California, Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

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