

Abstract Submitted
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Seed laser chirping for enhanced backward Raman amplification in plasmas¹ Z. TOROKER, V.M. MALKIN, N.J. FISCH, Princeton Plasma Physics Laboratory, Princeton, New Jersey USA, 08543 — Backward Raman compression in plasma enables pulse compression to intensities not available using material gratings. Mediating the compression with higher density plasma (moderately undercritical plasmas) generally produces shorter and therefore more intense output pulses. However, very high density plasma, even if sufficiently tenuous to be transparent to the laser, also produces group velocity dispersion of the amplified pulse, deleteriously affecting the interaction. Nevertheless the seed dispersion can be used advantageously, by chirping the seed pulse, the length to reach the highest intensity is considerably reduced. The fact that the plasma length is reduced has considerable advantages: first, there is less distance over which deleterious instabilities can develop, such as forward Raman amplification; second, there is less radiative loss through inverse bremsstrahlung; and, third, less plasma is needed in the first place, requiring less input pump energy.

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