

Abstract Submitted  
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**Relic crystal lattice effects on Raman compression of powerful x-ray pulses in plasmas**<sup>1</sup> VLADIMIR MALKIN, NATHANIEL FISCH, Princeton University — Powerful x-ray pulses might be compressed to even greater powers by means of backward Raman amplification in ultradense plasmas produced by ionizing condensed matter by the same pulses. The pulse durations contemplated are shorter than the time for complete smoothing of the crystal lattice by thermal motion of ions. Although inhomogeneities are generally thought to be deleterious to the Raman amplification, the relic lattice might in fact be useful for the Raman amplification. Caused by the lattice, the x-ray frequency band gaps can suppress parasitic Raman scattering of amplified pulses, while enhanced dispersion of x-ray group velocity near the gaps can delay self-phase modulation instability and also enable an extra amplification of x-rays in a way similar to the chirped pulse amplification technique.

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