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Particle-in-Cell Simulations of the High Frequency Hybrid Instability in Inertial Confiment Fusion Plasmas[1] FRANK TSUNG, UCLA, B.B. AFEYAN, Polymath Research INC, W.B. MORI — We present results on the laser-plasma interaction near the quarter critical surface under conditions relevant to inertial fusion. Under these conditions, the high frequency hybrid instability (HFHI) where one of the daughter waves have mixed polarization, is likely to be dominant. In fully nonlinear kinetic simulations with the code OSIRIS we show that the spectrum at early time is consistent with theory and the growth rate predicted by HFHI theory is born out by these simulations. We also investigate the saturated electrostatic (and electromagnetic) spectrum for long timescales for both fixed and mobile ions. For high temperatures where the HFHI is dominant the absorption is dominated by the absolutely unstable modes and absorption levels near 40% can occur even below the pure 2wp modes. In these cases, it is possible to excite HFHI modes as long as one is above the Raman threshold. We also investigate in detail the evolution of unstable modes. Nonlinear effects, such as the generation of hot electrons, half harmonics and the excitation of low frequency ion fluctuations, will also be discussed.

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