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Particle-in-Cell Simulations of the High Frequency Hybrid Instability in Inertial Confiment Fusion Plasmas[1] FRANK TSUNG, W.B. MORI, UCLA, B.B. AFEYAN, Polymath Research Inc. — 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. We also investgiate 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 when C_{mult} is less than 1 (where C_{mult} is the which the system is above the threshold). We also investigate in detail the evolution of unstable modes. Nonlinear effects, such as the generation of hot electrons, half harmonics generations and the excitation of low frequency ion fluctuations, will also be discussed.

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