

Abstract Submitted
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Longtime evolution of two-stream instability driven by an ion beam pulse propagating in a background plasma KENTARO HARA, IGOR KAGANOVICH, Princeton Plasma Phys Lab — The longitudinal two-stream instability of an ion beam pulse propagating through a background plasma is investigated using a collisionless one-dimensional kinetic simulation, in which a particle-in-cell (PIC) method is used for the ion beam and a direct Vlasov simulation is used for the background plasma. Previous kinetic simulations [E. Startsev et al. Nucl. Instrum. Methods. Phys. Res. A **733**, 80 (2014); E. Tokluoglu and I. Kaganovich, Physics of Plasmas **22**, 040701 (2015)] have shown that two-stream instability may play a deleterious role in compressing the ion beam. As the initial beam instability grows, the plasma electrons are accelerated by the plasma wave and can move faster than the ion beam. The stream of accelerated electrons moves ahead of the ion beam pulse and affects the background plasma, which in turn generates a secondary electron-beam two-stream instability. The numerical results show that the process reaches a quasi steady state with the modulations in electron and ion beam densities.

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