

R008-10

C会場 : 9/25 PM2 (15:45-18:15)

16:15~16:30

電子・陽電子プラズマにおけるフィラメント不安定

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Filamentation Instability in Electron-Positron Plasmas

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The nonlinear interaction between electromagnetic waves and plasmas attracts significant attention in astrophysics because it can affect the propagation of Fast Radio Bursts (FRBs), which are luminous millisecond-duration radio pulses. The filamentation instability (FI), which is a kind of four wave interactions, is considered to be dominant near FRB sources, and its non-linear development may also affect the inferred dispersion measure of FRBs. In this study, we carry out fully kinetic particle-in-cell simulations of the FI in unmagnetized electron-positron plasmas. Our simulations show that the FI generates transverse density filaments, and that the electromagnetic wave propagates in near vacuum between them, as in a waveguide. The density filaments keep merging until force balance between the wave ponderomotive force and the plasma pressure gradient is established. We estimate the merging time-scale and discuss the implications of filament merging for FRB observations in this talk.