

# Propagation of localized structures in relativistic magnetized electron-positron plasmas using particle-in-cell simulations

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## Resumen

We use a particle-in-cell simulation to study the propagation of localized structures in a magnetized electron-positron plasma with relativistic finite temperature. We use as initial condition for the simulation an envelope soliton solution of the nonlinear Schrodinger equation, derived from the relativistic two fluid equations in the strongly magnetized limit. This envelope soliton turns out not to be a stable solution for the simulation and splits in two localized structures propagating in opposite directions. However, these two localized structures exhibit a soliton-like behavior, as they keep their profile after they collide with each other due to the periodic boundary conditions. We also observe the formation of localized structures in the evolution of a spatially uniform circularly polarized Alfvén wave. In both cases, the localized structures propagate with an amplitude independent velocity. (C) 2015 AIP Publishing LLC.

## Palabras clave

**KeyWords Plus:** ALFVENIC WAVE-PACKETS; HOT ACCRETION DISKS; PAIR PLASMAS; GAUSS LAW; CODES; GENERATION

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