Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Particle acceleration via the Kelvin-Helmholtz instability EDUARDO PAULO ALVES, THOMAS GRISMAYER, GoLP/IPFN - LA Instituto Superior Tecnico, RICARDO FONSECA, DCTI/ISCTE, GoLP/IPFN - LA Instituto Superior Tecnico, LUIS SILVA, GoLP/IPFN - LA Instituto Superior Tecnico
— Collisionless plasma instabilities are a critical ingredient to understand the acceleration of high-energy particles in extreme astrophysical scenarios such as active galactic nuclei and gamma ray bursters. Since these extreme scenarios are usually associated with strain and rapid variability of the ejecta, it is likely that strong velocity shears are present, triggering the collisionless Kelvin-Helmholtz instability (KHI). We show that particles may accelerate to high energies by scattering in the evolving electric and magnetic fields of the KHI. Moreover, we present the relativistic two-fluid model of the KHI and perform a detailed comparison with PIC simulations results, namely growth-rates and length-scales of the instability. We analyze the dependence of the KHI on the gradient length of the shear, observing lower growth-rates for longer gradient-lengths. We further study the particle energy spectra generated by the instability, where we find evidence of non-thermal particle acceleration.

Eduardo Paulo Alves
GoLP/IPFN - LA Instituto Superior Tecnico

Date submitted: 15 Jul 2011 Electronic form version 1.4