Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

**Polarization studies of radiation spectra of relativistic collisionless shocks** UJJWAL SINHA, JOANA MARTINS, JORGE VIEIRA, GoLP/Instituto de Plasmas e Fusao Nuclear, Instituto Superior Tecnico, Universidade de Lisboa, Lisbon, Portugal, RICARDO FONSECA, DCTI, ISCTE-Lisbon University Institute, Lisbon, Portugal, LUIS SILVA, GoLP/Instituto de Plasmas e Fusao Nuclear, Instituto Superior Tecnico, Universidade de Lisboa, Lisbon, Portugal — Collisionless electromagnetic shocks generated by counterpropagating plasma flows mediated by the Weibel or Current Filamentation Instability (WI or CFI) may be at the origin of Gamma Ray Bursts (GRBs) and cosmic ray acceleration in astrophysics. These instabilities can also strongly amplify initial seed magnetic fields, leading to synchrotron and other radiation processes originating from particle scattering in self-generated WI or CFI magnetic fields. In this work we present OSIRIS particle-in-cell simulations of shocks generated by colliding relativistic electron positron plasmas. Using multidimensional simulations we examine the dynamics of plasma particles in the magnetic filaments generated at the shock front and explore the corresponding polarization signatures. We find that plasma particles can get trapped in these filaments leading to radiation bursts as a result of their jitter motion. Further, we analyse the polarization spectra of the radiation emitted from such particles and determine the fraction of radiated energy attributed to different polarizations. Such analysis is of special significance towards deeper understanding of bright afterglows produced when relativistic jets emanating from accreting black holes collide with ambient medium.

Jorge Vieira
GoLP/Instituto de Plasmas e Fusao Nuclear, Instituto Superior Tecnico,
Universidade de Lisboa, Lisbon, Portugal

Date submitted: 11 Jul 2014 Electronic form version 1.4