

CURRENT DRIVEN INSTABILITIES AND MAGNETIC FIELD AMPLIFICATION AT RELATIVISTIC SHOCK FRONTS

J.G. Kirk¹, B. Reville², and P. Duffy²

¹*Max-Planck-Institut für Kernphysik, Heidelberg, Germany,* ²*School of Mathematical Sciences, University
College Dublin, Ireland*

Recently, Bell [1] has pointed out that cosmic rays which are effectively accelerated at a supernova remnant shock front drive a rapidly growing, nonresonant instability. In its nonlinear phase, this instability can lead to strong amplification of the ambient magnetic field. In this paper we present the relativistic generalisation of this mechanism and discuss its application to the problem of magnetic field amplification in gamma-ray burst shocks.

References

[1] Bell, A.R., 2004, MNRAS 353, 550