Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Effects of Magnetic Turbulence on Radiation Spectra in GRB Shocks[1] SARAH REYNOLDS, SRIHARSHA POTHAPRAGADA, MIKHAIL MEDVEDEV, University of Kansas — Relativistic collisionless shocks in space are driven by strong explosions, such as supernovae and gamma-ray bursts (GRBs). These shocks produce small-scale Weibel magnetic fields and accelerate electrons, which emit jitter/synchrotron radiation. We consider the dependence of the jitter radiation spectrum on the properties of the magnetic turbulence at the shock and its temporal evolution. For a viewing angle $0 < \Theta < \pi/2$ between the observer's position and the direction of the shock propagation $\mathbf{n}$, the jitter radiation spectrum depends upon both the transverse and longitudinal (along $\mathbf{n}$) magnetic field spectra, f_{xy} and f_z, respectively. However, the shapes of f_{xy} and f_z are not, in general, known. Therefore, we use heuristic arguments and the results of recent numerical 3D PIC simulations. We calculate the jitter radiation spectra for different viewing angles, Θ, and several key parameters of the magnetic field spectra. We speculate that the coupling of relativistic aberration and the radiation spectrum anisotropy naturally explains the spectral evolution of GRB prompt emission.

[1]This work is supported by DoE grant DE-FG02-04ER54790

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Date submitted: 21 Jul 2005 Electronic form version 1.4