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Modeling radiation from relativistic collisionless shocks[1] SHRIHARSHA POTHAPRAGADA, SARAH REYNOLDS, MIKHAIL MEDVEDEV, University of Kansas — Observed radiation from Gamma Ray Bursts (GRB) exhibits extremely rapid variation of spectral and temporal characteristics. The emission is thought to be produced at relativistic shocks associated with a GRB explosion. Our work uses the detailed theory of jitter radiation from relativistic collisionless shocks mediated by the Weibel instability, which produces small scale (of order a skin depth), high magnitude magnetic fields to model this variability. We employ relativistic shock kinematics to derive the light curves and the underlying spectral evolution. Our analysis has been extended to obtain complete light curves and correlations in the spectral parameters. We have developed a code that emulates the random source activity enabling us to extend our previous modelling of individual subpulses to a typical full duration burst. The distinct tracking of the photon flux and the low energy spectral index α – a salient feature of our theory – has indeed been observed in a number of bursts . We also discuss how plasma parameters of the shock and ejecta may be deduced.

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