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Temporal Evolution and Cross-correlations in Spectral Parameters of GRB Prompt Emission SRIHARSHA POTHAPRAGADA, MIKHAIL MEDVEDEV, SARAH REYNOLDS, University of Kansas — Prompt emission from gamma-ray bursts (GRBs) exhibits very rapid, complicated temporal and spectral evolution. This diverse variability in the lightcurves reflects the complicated nature of the underlying physics, in which inter-penetrating relativistic shells in the outflow are believed to generate strong magnetic fields that vary over very small scales. We simulate full GRB lightcurves and spectra, with the aforementioned assumptions. The framework is unbiased to any particular choice of radiation mechanism. The effects of various source geometries, viewing angles, and bulk Lorentz factor profiles of the radiating outflow jets on the spectral features and evolution of these light-curves are explored. We utilize the anisotropic jitter radiation mechanism, among others, as test cases, and extract spectral correlations as seen in observations. We report that even with a simplified model, we are able to duplicate certain features observed in the GRB prompt emission spectra, such as the occurrence of hard, synchrotron-violating spectra, the "tracking" of observed flux with spectral parameters, and spectral softening below peak energy within individual episodes of the light curve. We highlight predictions that can be made as a result of our simulations, in the light of recent advances in the observational sphere of GRB physics.

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