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Fitting gamma-ray burst prompt emission spectra with a model for subphotospheric dissipation

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The prompt emission mechanism of gamma-ray bursts (GRBs) is still unknown. While GRB spectra are usually well fitted by the Band function, an empirically motivated, smoothly broken power law, this gives little understanding of the underlying radiation mechanism. In this talk I will present results from fitting a physical model to prompt GRB spectra observed by Fermi. The model simulates the scenario of dissipation of kinetic energy below the photosphere in a relativistically expanding fireball. It is based on the code by Pe'er et al. 2005 and includes Compton and Inverse Compton scattering, synchrotron emission as well as pair production/annihilation. The data are fitted using an Xspec table model created from a large number of simulations. Our initial results show that the model can provide good fits to different types of spectra, capturing spectral features not caught by the corresponding Band function fits. I will present our latest results from fitting the model and discuss the implications of our best-fit parameters.

Collaboration

Fermi LAT collaboration

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