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An Investigation on the GRB Peak Energy and Low-Energy Spectral Slope

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There is no conclusive model for the emission mechanism for Gamma-Ray Bursts (GRBs). The conventional synchrotron emission models have been shown to present difficulties in explaining the hard low-energy spectral slopes [3] and the sharp peak curvature [6] in the observed time-resolved spectra. On the contrary, thermal emission from the photosphere (whether or not re-processed by sub-photospheric dissipation, which results in a broadened Planck function) provides a natural explanation for most of the narrow time-resolved spectra [5, 4]. The peak energy and low-energy spectral slope of some GRB spectra are shown to exhibit correlation [1]. We investigate such behaviour by performing time-resolved spectral analysis using Bayesian techniques [2] and compare the results to various emission models including the thermal emission models.

7th Fermi Symposium 2017
15-20 October 2017
Garmisch-Partenkirchen, Germany

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PoS(IFS2017)083

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