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Modelling flares, breaks, and energetic photons in GRB Fermi-LAT Light curves

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The Fermi-LAT collaboration presented the second gamma-ray burst (GRB) catalog covering its first ten years of operations. A large fraction of light curves (LCs) in this catalog cannot be explained by the closure relations of the standard synchrotron forward-shock (FS) model, suggesting that there could be an essential contribution from another process. Therefore, we derive the synchrotron self-Compton (SSC) LCs from the reverse shock in the thick- and thin-shell regime for a constant-density and stellar-wind medium. We show that this emission could explain the GeV flares exhibited in some LAT LCs. Additionally, we show that the passage of the FS synchrotron energy break in the LAT band could be responsible for the late time steepening of LAT LCs. In particular cases, we model the LAT LCs of GRB 160509A, GRB 131108A, and GRB 160816A.

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