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Bethe-Heitler constraints on proton synchrotron models for GRBs.

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GRB spectra seem to be well fitted by models based on marginally fast-cooled synchrotron radiation. This observation challenges the synchrotron process as a viable mechanism as it leads to (too) large emission radii and (too) large bulk Lorentz factors. To overcome this difficulty, it was proposed that proton could be the particles radiating synchrotron emission. I will show that if protons are indeed at the origin of GRB emission, electron-positron pair creation by the Bethe-Heitler process could also be efficient, leading to the creation of an additional spectral component which takes the form of a sub-dominant power-law with well-defined characteristics. I will argue that such power-law might have already been observed.

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