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Prospect for detection of pair-echo emission from TeV gamma-ray bursts

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The presence of pair echo GeV emission after a Gamma Ray Burst (GRB) detected in the very-high energy band (VHE, E>100 GeV) can be the signature of the existence of a non zero magnetic field in the intergalactic medium. Indeed, VHE photons interact with the Extragalactic Background Light (EBL) to produce electron-positron pairs, which in turn can initiate electromagnetic cascades. In presence of a not negligible Intergalactic Magnetic Field (IGMF) this emission is delayed. In this contribution we propose a study of the evolution of the pair echo emission during the afterglow of the GRB. We use simulations to estimate the pair echo lightcurves induced by the propagation of primary VHE gamma rays injected instantaneously by the source. The expected pair echo lightcurve is computed convolving the variability pattern of the GRB in the VHE band with the simulation output. We followed this procedure simulating the pair echo signal from a selected synthetic population of GRBs and producing the pair echo lightcurves in the GeV domain for different IGMF strengths. We show that, depending on the characteristics of the GRBs (e.g. jet opening angle, distance and energetic), the pair echo signal may be dominant for late times with respect to the afterglow.

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