

## Constraints on the intergalactic magnetic from Fermi-LAT observations of GRB 221009A

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The observation of delayed GeV emission after a Gamma Ray Burst (GRB) detected at the very-high energies (VHE) beyond 100 GeV could indicate 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. An intergalactic magnetic field (IGMF) would deflect the pairs, leading to a delay of this emission, a so-called pair echo. The VHE detection of GRB221009A with LHAASO at several TeV offers a unique opportunity to probe the IGMF. Here we use the reported LHAASO VHE spectrum and CRPropa Monte Carlo simulations to generate time and energy dependent predictions of the cascade for different IGMF strengths in the Fermi-LAT energy domain. Using these predictions, we search for the pair echo using the full Poisson likelihood information. Depending on the modelling of the afterglow emission of the GRB, we are able to set new constraints on the IGMF strength, excluding fields below  $1e-17$  G.

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