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Probing the intergalactic magnetic field through observations of high energy gamma-rays produced by electromagnetic cascades.

Tuesday, 26 June 2018 15:00 (2 hours)

Currently there is limited knowledge of the origin of the intergalactic magnetic fields (IGMF) that lie between galaxies, galaxy clusters and cosmic voids. Understanding the origin of the IGMF is a crucial component in models of galaxy and galaxy clusters formation. This magnetic field can be probed indirectly by its effect on electromagnetic cascades initiated by gamma-gamma absorption of very high energy (VHE) gamma-rays, produced in blazars, due to its interaction with the extragalactic background light (EBL). The electron-positron pairs produced via the gamma-gamma absorption interact with the intergalactic magnetic field (IGMF) and can be deviated from their original trajectory path. These pairs can then Compton-scatter off the cosmic microwave background (CMB) to produce high energy gamma-rays that may be detected with Fermi-LAT. The strength of this signal strongly depends on the IGMF strength (B) and the coherence length (L). This secondary gamma-ray emission would be superimposed on the blazar's intrinsic gamma-ray spectrum. A selection of bright blazars will be re-analysed using the upgraded Pass 8 analysis pipeline, to search for this secondary component. This will be used to place constraints on the IGMF strength. The initial results from this project will be presented.

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