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Multimessenger Constraints on Intergalactic Magnetic Fields from Flaring Objects

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The origin of magnetic fields in the universe is an open problem. Seed magnetic fields possibly produced in early times may have survived up to the present day close to their original form, providing an untapped window to the primeval universe. The recent observations of high-energy neutrinos from the blazar TXS 0506+056 in association with an electromagnetic counterpart in a broad range of wavelengths can be used to probe intrinsic properties of this object and the traversed medium. Here we show that intergalactic magnetic fields (IGMFs) can affect the intrinsic spectral properties of this object reconstructed from observations. In particular, we point out that the reconstructed maximum gamma-ray energy of TXS 0506+056 can be significantly higher if IGMFs are strong. Finally, we use this flare to constrain both the magnetic-field strength and the coherence length of IGMFs.

Keywords

blazars; TXS 0506+056; intergalactic magnetic fields; gamma rays; neutrinos

Collaboration

other Collaboration

Subcategory

Theoretical Results

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