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Probing cluster environments of blazars through gamma-gamma absorption

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Blazars, a class of radio-loud active galactic nuclei with their jets pointed close to the line of sight to Earth, are the most abundant extragalactic gamma-ray sources detected both by the Fermi Gamma-Ray Space Telescope and by groundbased atmospheric Cherenkov Telescope facilities. Most blazars are known to be hosted in giant Elliptical galaxies, but their cluster environments are poorly characterized. Very-high-energy (VHE; above ~ 10 GeV) gamma-rays emitted in the jet may be absorbed by low-energy (IR, optical) radiation through gamma-gamma pair production, leaving a characteristic imprint of the surrounding radiation field in the high-energy and VHE gamma-ray spectrum of the blazar. We study the possibility of the efficient absorption of the VHE gamma-rays in the cluster environments of gamma-ray bright blazars due to the intracluster light and/or close companion galaxies. We show that such absorption is negligible and should not affect the gamma-ray emission.

Collaboration

– not specified –

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Primary author: SUSHCH, Iurii (North-West University)**Co-author:** BÖTTCHER, Markus (North-West University)**Presenter:** SUSHCH, Iurii (North-West University)**Session Classification:** Poster 2 GA**Track Classification:** GA-TH