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Break in the Very High Energy Spectrum of PG 1553+113: New Upper Limit on Its Redshift?

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Abstract content

PG 1553+113 is a known BL Lac object, newly detected in the GeVTeV energy range by H.E.S.S. and MAGIC. The redshift of this source is unknown and a lower limit of z>0.09 was recently estimated. The very high energy (VHE) spectrum of PG 1553+113 is attenuated due to the absorption by the low-energy photon field of the extragalactic background light (EBL). Here we correct the combined H.E.S.S. and MAGIC spectrum of PG 1553+113 for this absorption assuming a minimum density of the evolving EBL. We use an argument that the intrinsic photon index cannot be harder than Gamma=1.5 and derive an upper limit on the redshift of z<0.69. Moreover, we find that a redshift above z=0.42 implies a possible break of the intrinsic spectrum at 200 GeV. Assuming that such a break is absent, we derive a much stronger upper limit of z<0.42. Alternatively, this break might be attributed to an additional emission component in the jet of PG 1553+113. This would be the first evidence for a second component detected in the VHE spectrum of a blazar.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 3 (OG part 2), pages 1037-1040

Primary author(s) : Mr. MAZIN, Daniel (Max-Planck-Institute for Physics, Munich)

Co-author(s) : Dr. GOEBEL, Florian (Max-Planck-Institute for Physics, Munich)

Presenter(s) : Mr. MAZIN, Daniel (Max-Planck-Institute for Physics, Munich)

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