Contribution ID : **1045** Type : **Oral**

New Limits on the Extragalactic Background Light from the Spectra of all known TeV Blazars

Tuesday, 10 July 2007 08:54 (0:12)

Abstract content

The star and galaxy formation history has left an imprint on the diffuse extragalactic radiation field in the ultraviolet to infrared wavelength regime. In the spectral energy distribution two distinct bumps are expected: A first bump in the optical to near-infrared coming from direct starlight redshifted over time and a second bump in the infrared from dust-reemission. Direct measurements of this extragalactic background light (EBL) have proven to be difficult, especially in the mid-infrared where foregrounds dominate (zodiacal light). The observation of distant sources of TeV-photons via Imaging Cherenkov Telescopes can provide an indirect measurement of the EBL: The TeV-photons are attenuated via pair production and the observed spectra therefore carry an imprint of the EBL. With assumptions about the source spectrum limits on the EBL can be derived. Since the detection of the first extragalactic TeV-source this technique has been applied in various forms to many of the available spectra. In our paper we describe a generic way to derive limits on the EBL by using a scan on a grid in wavelength vs EBL density and using only minimal assumptions about the source spectrum. These technique allows to explore a wide range of EBL-shapes and to treat all available spectra of extragalactic TeV-sources in a consistent way. We utilize the spectra of all TeV blazars with published spectra, making this the most complete study of this type to date. We present strong limits on the EBL in a wide wavelength range from the optical to the far-infrared.

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 1049-1052

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Session Classification : OG 2.3, 2.4

Track Classification : OG.2.3