

Upper Limits on the Extragalactic Background Light from the Very High Energy Gamma-Ray Spectra of Bl

Contributed by M. Schroedter
Monday, 01 August 2005

The Astrophysical Journal, Volume 628, Issue 2, pp. 617-628.

[astro-ph/0504397](#)

The direct measurement of the extragalactic background light (EBL) is difficult at optical to infrared wavelengths because of the strong foreground radiation originating in the solar system. Very high energy (VHE; $E > 100$ GeV) gamma rays interact with EBL photons of these wavelengths through pair production. In this work, the available VHE spectra from six blazars are used to place upper limits on the EBL. These blazars have been detected over a range of redshifts, and a steepening of the spectral index is observed with increasing source distance. This can be interpreted as absorption by the EBL. In general, knowledge of the intrinsic source spectrum is necessary to determine the density of the intervening EBL. Motivated by the observed spectral steepening with redshift, upper limits on the EBL are derived by assuming that the intrinsic spectra of the six blazars are $\propto E^{-1.8}$. Upper limits are then placed on the EBL flux at discrete energies without assuming a specific spectral shape for the EBL. This is an advantage over other methods since the EBL spectrum is uncertain.