Preprint Series in Particles and Cosmos Physics
nº IPARCOS-UCM-26-015

A New Measurement of the Extragalactic Background Light using 15 yr of Fermi-Large Area Telescope Data

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March 2026

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Abstract

The extragalactic background Light (EBL) from ultraviolet to infrared comprises the emission from all stars, galaxies, and actively accreting black holes in the observable Universe. A precise measurement of the EBL is critically important to probe models of star formation and galaxy evolution. The EBL can be measured via the absorption imprint left on the spectra of gamma-ray blazars. In this work, we rely on 15 years of Fermi-LAT data and 1576 blazars to measure the EBL optical depth in the 0 < z < 4.3 range. We detect the EBL attenuation with 23sigma significance and measure the optical depth in 19 redshift bins, extending the coverage and improving on our previous results. This allows us to reconstruct the EBL evolution and find general consistency with recent EBL models. These results represent the most precise determination of the EBL with GeV gamma rays to date.

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