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The Imprint of the Extragalactic Background Light in the Gamma-ray Spectra of Blazars MARCO AJELLO, University of California, Berkeley, ROLF BUEHLER, Desy Zeuthen, ANITA REIMER, Innsbruck University, FERMI-LAT COLLABORATION COLLABORATION — The light emitted by stars throughout the history of the Universe is encoded in the intensity of the extragalactic background light (EBL). Knowledge of the EBL is important for understanding the nature of star formation and galaxy evolution. Direct measurements of the EBL are very difficult due to the intense zodiacal light and the Galactic foreground emission. High-energy gamma rays may interact with photons of the EBL and generate positron-electron pairs. This introduces an attenuation feature in the spectra of distant gamma-ray sources that has been used in the past to set upper limits on the opacity of the Universe and the energy density of the EBL. In this talk, we will report the first detection of an absorption feature seen in the combined spectra of a sample of gamma-ray blazars detected by the Fermi Large Area Telescope (LAT) out to a redshift of z>1.6. This feature is caused by attenuation of gamma rays by the EBL at optical to UV frequencies, and points to a minimal level of EBL, consistent with the observed star formation rate and with low-opacity EBL models. We will present the Fermi observations and discuss the implications for the generation of a diffuse UV background at high redshifts. The prospects for a refined measurement of the EBL extending to redshifts higher than 1.6 will also be discussed.

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