



Contribution ID: 5

Type: **Invited talk**

Constraints on the gamma-ray opacity of the Universe with the Fermi-LAT instrument

Friday 12 November 2010 09:30 (30 minutes)

The Fermi Large Area Telescope is scanning the sky for gamma-rays in the range ~ 20 MeV to over 300 GeV thereby revealing a wealth of high energy sources. Gamma rays may interact with low-energy photons from the Extragalactic Background Light (EBL) through photon-photon pair production if above the energy threshold. This results in redshift- and energy-dependent attenuation features in extragalactic source spectra such as from blazars and gamma-ray bursts (GRBs). Using photons above 10 GeV collected by the LAT during more than one year of observations from high-redshift blazars and GRBs, the effect of gamma-ray flux attenuation by the EBL is investigated. Several techniques are used to place robust upper limits on the gamma-ray opacity of the Universe at various energies and redshifts. By comparing with predictions from a range of EBL models, high-confidence limits on EBL intensity models at optical-ultraviolet wavelengths are derived.

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Session Classification: Session 9

Track Classification: Cosmic infrared background