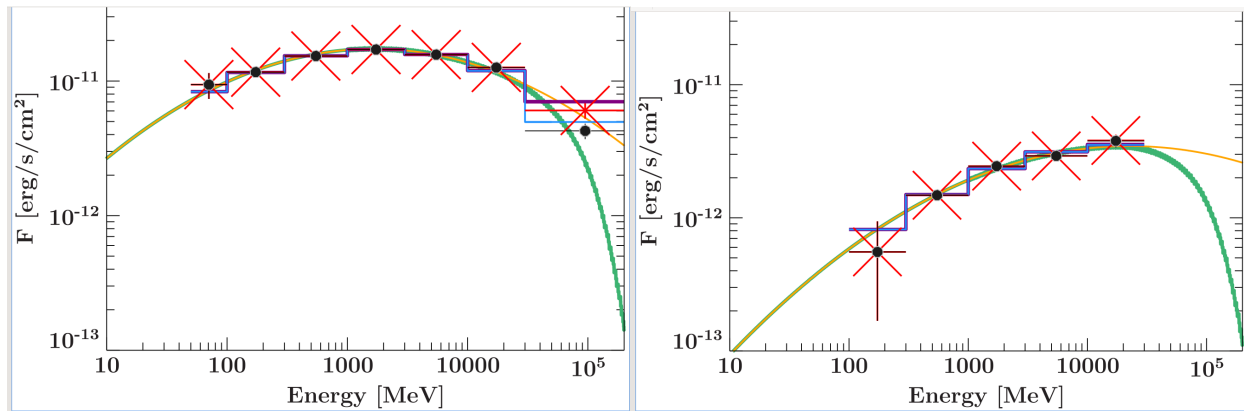


Extragalactic Background Light (EBL) absorption in the gamma-ray band

Saron Workineh, 2028

Extragalactic background light (EBL) is all the light present in the intergalactic medium, produced by galaxies and stars. This light hinders observation of distant gamma-ray sources (such as blazars) through pair production: Gamma rays can interact with EBL photons, creating electron and positron pairs. This absorption effect increases with the energy of the gamma ray and the distance of the gamma-ray source (as more distance means more time travelling through the EBL).

The purpose of this research was to create the code for a model in the Interactive Spectral Interpretation System (isis) to correct for the EBL absorption and determine the original flux of gamma rays sent by the source across a spectrum of energies. This was done by determining the correction factor for the energies in the data based on five EBL models. Below are the flux vs energy graphs for two sources before correction (in green) and after correction (in orange).



Source: 4FGL J0957.6+5523 Redshift: 0.90

Source: 4FGL J1448.0+3608 Redshift: 1.06

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Reference:

Armstrong, Brown, and Chadwick. (2018). Fermi-LAT high z AGN and the Extragalactic Background Light.