

The first skymap of the extragalactic background light from gamma-ray spectra, a new window on cosmological anisotropies

Olivier Hervet,^{a,*} David A. Williams^a and Amy Furniss^{a,b}

^a*Santa Cruz Institute for Particle Physics and Department of Physics, University of California, Santa Cruz, CA 95064, USA*

^b*Department of Physics, California State University–East Bay, Hayward, CA 94542, USA*

E-mail: ohervet@ucsc.edu

Extragalactic gamma-ray sources have been proven to be great probes to measure the extragalactic background light (EBL) over a large frequency range and for various redshifts. However, our knowledge of the amplitude and distribution of EBL spatial anisotropies is still mostly uncharted territory. Thanks to more than a decade of gamma-ray observations with the space telescope Fermi-LAT and more than two decades of ground-based Cherenkov telescope operations, we now have gamma-ray spectral measurements of hundreds of extragalactic sources, mostly blazars, that efficiently constrain the EBL opacity. This study presents an EBL analysis based on Fermi (4FGL-DR3 and 3FHL) catalogs and archival very-high-energy spectra from ground-based Cherenkov observatories from the new catalog STeVECAt. By using this exhaustive sample of gamma-ray spectra, we build the first-ever full skymap of EBL opacity from gamma-ray observations. We discuss its implications on probing for large-scale EBL anisotropies.

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*Speaker