APR13-2013-000545

Abstract for an Invited Paper
for the APR13 Meeting of
the American Physical Society

**Gamma-ray Opacity and Measurements of the EBL**

RUDY GILMORE, UC Santa Cruz

Attenuation of high-energy gamma rays by pair-production with UV, optical and IR extragalactic background light (EBL) photons provides a link between the history of galaxy formation and high-energy astrophysics. I will present results from new semi-analytic models (SAMs), which employ all ingredients thought to be important to galaxy formation and evolution, as well as an improved method for reprocessing of starlight by dust to mid- and far-IR wavelengths. These SAMs are based upon a hierarchical structural formation scenario, and are successful in reproducing a large variety of observational constraints such as number counts, luminosity and mass functions, and color bimodality. Our fiducial model is based upon a WMAP5 cosmology and treats dust processing of starlight using observationally-derived templates. This model predicts a background flux considerably lower than found in optical and near-IR measurements that rely on subtraction of zodiacal and galactic foregrounds, and is in good agreement with the lower bounds set by number counts of resolvable sources at a large number of wavelengths and observational EBL studies that employ large-scale galaxy surveys. I will address the implications of this work for blazar observations, and discuss how the science of gamma-ray astronomy will continue to help constrain cosmology. Our prediction of a low EBL flux suggests an optimistic future for further studies of distant gamma-ray sources, and as the next generation of large ground-based gamma-ray observatories come online over the next decade, the number and redshift of known extragalactic sources can be expected to increase dramatically. This will provide new constraints on background light both locally and in the poorly-understood high-redshift regime.