A11r Observational Cosmology through high and very high energy gamma rays

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High energy and Very high energy (HE, E > 100 MeV, VHE, E > 100 GeV) gamma-rays are absorbed via interaction with low-energy photons from the extragalactic background light (EBL) if the involved photon energies are above the threshold for electron-positron pair creation. The HE and VHE gamma-ray absorption, which is energy dependent and increases strongly with redshift, distorts the energy spectra observed from distant objects. The observed energy spectra of the AGNs carry, therefore, an imprint of the EBL. The detection of hard VHE gamma-ray spectra of distant sources (z = 0.11 – 0.95) by ground based Cherenkov telescopes such as H.E.S.S., MAGIC and VERITAS enabled to set strong upper limits on the EBL density, using certain basic assumptions about blazar physics. In a similar method Fermi/LAT data of a large blazar sample at HE allowed to resolve the EBL with a precision of about 25%. In this talk, we give an overview of the EBL and Hubble constant constraints, their limitations and perspectives for observational cosmology through HE/VHE gamma rays with satellites (Fermi/LAT, GAMMA-400, ASTROGAM) and the ground based observatory Cherenkov Telescope Array (CTA).