

Unveiling the properties of star-forming galaxy populations in the gamma-ray sky

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Star-forming galaxies (SFGs) are rich in energetic cosmic rays. These CRs can undergo hadronic interactions to produce gamma-rays, with the combined gamma-ray glow from populations of SFGs forming an important component of the isotropic extra-galactic gamma-ray background (EGB). The gamma-ray emission from galaxies is dependent on their intrinsic physical properties - in particular, their star-formation rate, abundance of dense molecular gas and their size. As such, different classes of SFGs contribute differently to the EGB. In this talk, I will show that the SFG component of the EGB is dominated by starburst SFGs, while the contribution from main sequence SFGs is marginal at all energies. I will also discuss the physical characteristics of those galaxy populations which dominate the SFG contribution to the gamma-ray background, their redshift evolution, and the implications for using the EGB to probe CR engagement in SFGs over cosmic time.

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