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Unveiling the unresolved gamma-ray sky through its anisotropies

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The gamma-ray sky has been revealed in the last decade by the Fermi Large Area Telescope (LAT), offering an outstanding picture of our Universe at the highest energies. The majority of this gamma-ray emission has been attributed to known processes involving cosmic-ray interactions with the interstellar medium within our Galaxy. Another important contribution is represented by the gamma-ray emission of known Galactic and extragalactic astrophysical sources. However, still an important fraction (~ 20%) of the total gamma-ray emission remains unresolved, and therefore we referred to it as the unresolved gamma-ray background (UGRB). Guaranteed contribution to this component is the cumulative emission of gamma-ray sources that are too faint to be resolved separately and hence lie below the current instrumental sensitivity. On the other hand, even more exotic scenarios involving dark matter particles may contribute as well, making the exact composition of the UGRB one of the main unanswered questions in gamma-ray astrophysics. The unprecedented large sample of high quality gamma-ray photons provided by the Fermi-LAT opened a new window on this study: the measurement and characterization of UGRB spatial anisotropies. In this talk I will give an overview of all the different techniques employed in the effort to give a definitive answer to the question of the UGRB composition.

Summary

The unprecedented large sample of high quality gamma-ray photons provided by the Fermi-LAT opened a new window on the study of the unresolved gamma-ray background (UGRB): the measurement and characterization of its spatial anisotropies. In this talk I will give an overview of all the different techniques employed in the effort to give a definitive answer to the question of the UGRB composition.

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