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Cosmic Voids: Unlocking Novel Statistics Completing Galaxy Clustering

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In recent years, cosmic voids have emerged as powerful tools in cosmology, offering unique insights that complement traditional two-point statistics of galaxy clustering. To fully exploit the potential of voids for the vast datasets from ongoing and upcoming galaxy surveys, robust statistical modeling and careful data reduction are crucial.

This talk will delve into the application of the three primary void statistics in galaxy surveys: the void size function, the void-galaxy cross-correlation function, and the void auto-correlation function. I will highlight how theoretical modeling and optimized data processing can enhance their constraining power while avoiding biases. Particular focus will be placed on the role of voids within the Euclid and Roman survey frameworks, illustrating their complementarity to traditional analyses in probing dark energy and other key cosmological parameters. These results highlight the potential of combining cosmic voids with galaxy two-point statistics to enhance the constraining power of cosmological analyses in stage IV galaxy surveys.

Author: VERZA, Giovanni

Presenter: VERZA, Giovanni

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