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Optimal Techniques for Analyzing Line Intensity Mapping Data

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Line intensity mapping (LIM) has emerged as a powerful tool in astrophysics, leveraging statistical analysis of integrated spectral line emissions originating from distant star-forming galaxies. This talk will review key methods for LIM data analysis, including power spectrum and voxel intensity distribution techniques, to constrain cosmological and astrophysical parameters. I will also explore advanced field-level inference techniques using machine learning, emphasizing its potential to improve data interpretation. The strengths and limitations of these approaches will be discussed, particularly their applications in cross-correlation studies with tracers like galaxy surveys and 21cm signals. This overview aims to provide insights into optimizing LIM data analysis for current and next-generation experiments.

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