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Galactic Chemical and Dust Gradients: Predictions and Insights from Chemical Evolution Models

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Galactic chemical evolution models are crucial ingredients to place first, broad constraints on the limits and the evolution of the Galactic Habitable Zone (GHZ), as well as for the conditions for life formation within our Galaxy. In fact, by comparing model predictions of element abundances with observations from different stellar populations and the interstellar medium (ISM), we can place stringent constraints on Galactic evolution, thereby refining our understanding of Galactic habitability. In this talk, I will present recent findings on the chemical abundance gradients within the Galaxy, with a particular emphasis on the outer regions beyond the solar annulus, where new data have significantly altered our "chemical"perspective on such regions. Additionally, I will

provide a comprehensive overview of dust evolution in galaxies. Dust, with its scaling relations, is indeed a critical factor in the understanding of galactic evolution and in particular can serve as a more direct proxy than metallicity in studies related to planetary systems. Therefore, I will also discuss recent advancements in dust modelling for local disk galaxies, highlighting both the progress made and the challenges that remain in this field.

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