



# **LARGE SCALE GALACTIC DYNAMICS : THE PERSPECTIVE FROM NUMERICAL SIMULATIONS**

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Observations resolving the internal structures of nearby disk galaxies reveal the key role of large-scale dynamics in setting the organization of the ISM and influencing star formation. At the same time, feedback from young stars couples to galactic scales in a non-trivial way, such that the interplay between large and small scales is still not fully understood. The tight connection between galaxies, clouds and stars is being explored by numerical simulations of disk galaxies, with or without cosmological context, but the enormous range of scales and physical processes involved remains challenging. In this lecture, I will briefly introduce the different type of simulations. I will explain how galactic dynamics and galactic structures like spiral arms and bars influence the evolution of the ISM and the formation of stars. I will summarize the state-of-the-art of simulation efforts and will present the results obtained to illustrate and quantify this multi-physics and multi-scale coupling. I will conclude by listing a few open questions and challenges for the future and the next generations of simulations.