The history of the Milky Way told by its mergers

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Abstract

Galactic archeology aims at unveiling the origins of the Milky Way, particularly through detailed studies of stellar populations, and with the ultimate goal of understanding galaxy formation in general. However, it is yet not clear whether the Milky Way is representative of galaxies in its mass range, or if a special formation history made it an outlier. In other words, to what extent can we extrapolate the conclusions from detailed observations, like spectroscopic surveys, to other galaxies? By exploring a diversity of formation scenarios, numerical simulations can provide hints to these questions. Using Vintergatan, a new cosmological zoom simulation of a Milky Way-like galaxy, I will show the different signatures galaxy interactions and mergers leave on stellar populations, over a wide parameter space. I will particularly focus on the induced starbursts, the variation of the chemical enrichment, stellar kinematics, and the structural morphology of galaxies, in the context of the thin and thick disks of the Milky Way. I will discuss how different formation histories, as expected in other galaxies, yield either similarities or distinct features in the present-day day properties of the stellar components, and how such information could be used to retrace the formation histories of galaxies.

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