

Formation of thick disks in galaxies

A. Villalobos

Kapteyn Astronomical Institute

A. Helmi

Kapteyn Astronomical Institute

The formation and evolution of galaxies is one of the great outstanding problems of astrophysics. The current paradigm for the formation of structure in the Universe postulates that galaxies grow in a hierarchical fashion, through the mergers of smaller subunits. Even within this broad context, we have only a crude picture of how galaxies like our own came into existence. The aim of this PhD project is to develop a physical model for the formation of what seems to be one of the most ubiquitous components of late-type galaxies: the thick disk. On the one hand, our goal is to provide a detailed physical picture of how the thick disk of our Galaxy came about and in what ways it is associated to the primordial galactic building blocks. On the other hand, and using the basic assumptions of the hierarchical paradigm, we wish to address statistical aspects of the galaxy population, such as the expected frequency of thick disks and their stellar populations characteristics (age, metallicities, colors, etc). The outcome of such modelling will be compared to currently available observations of present-day structure, dynamics and stellar content of thick disks, in the Milky Way and nearby galaxies. On the longer run, we foresee applications to all-sky surveys such as RAVE and GAIA, where multi-dimensional information will be available for millions of stars in our Galaxy. We also expect that surveys like SDSS will provide large samples of galaxies to perform statistical studies which can put constraints on galaxy formation theories

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