

Nonlinear Phenomena shaping the structure of spiral galaxies

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Understanding the dynamical mechanisms that act on the disks of spiral galaxies is the key for understanding their morphologies. This in turn is directly related with the global star formation taking place on the disks, with the streaming of gas towards the galactic centers and the distribution of dark matter in the galaxies. I will show how nonlinear phenomena determine the extent of the spiral arms and the bars, as well as the complicated vertical profiles of the bars, away from the equatorial plane. I will review some of the main mechanisms that support morphological features and underline the role of chaos in shaping their structures. I will present characteristic examples of two dimensional [1], [2], [3] and three dimensional [4], [5] systems, which are used in the investigation and explanation of the observed morphologies.

References

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