

Galactic planetary science

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Planetary science beyond the boundaries of our Solar System is today in its infancy. Until a couple of decades ago, the detailed investigation of the planetary properties was restricted to objects orbiting inside the Kuiper Belt. Today, we cannot ignore that the number of known planets has increased by two orders of magnitude nor that these planets resemble anything but the objects present in our own Solar System. Whether this fact is the result of a selection bias induced by the kind of techniques used to discover new planets—mainly radial velocity and transit—or simply the proof that the Solar System is a rarity in the Milky Way, we do not know yet. What is clear, though, is that the Solar System has failed to be the paradigm not only in our Galaxy but even ‘just’ in the solar neighbourhood. This finding, although unsettling, forces us to reconsider our knowledge of planets under a different light and perhaps question a few of the theoretical pillars on which we base our current ‘understanding’. The next decade will be critical to advance in what we should perhaps call Galactic planetary science.

In this talk, we review highlights and pitfalls of our current knowledge of this topic and elaborate on how this knowledge might arguably evolve in the next decade. More critically, we identify what should be the mandatory scientific and technical steps to be taken in this fascinating journey of remote exploration of planets in our Galaxy.