

Discriminating habitable worlds from their atmospheric composition

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The acquisition of spectroscopic data of the Earth's atmosphere from artificial satellites has changed our perception of terrestrial life and has provided, for the first time, a rigorous scientific framework to search for life elsewhere in our Galaxy. Seen from the outside, our planet appears to be similar, for some aspects, to other planets, yet it shows distinctive signatures of a life-hosting planet, which cannot be found elsewhere in the Solar System.

Lovelock (1965) suggested to search for the presence of compounds in the planet's atmosphere which are incompatible on a longterm basis, i.e. in chemical disequilibrium – for example, oxygen and hydrocarbons co-exist in the Earth's atmosphere. While being the only recipe of biosignature currently available, is that a robust one?

The discovery of planets around other stars will offer in the next decades the chance to test this hypothesis outside the boundaries of our Solar System. While the number of discovered planets located at the right distance to the star to host some liquid water is increasing by the day, are those objects really habitable or inhabited?

From the little we know about these alien worlds, it appears we need to progress further in the understanding of galactic planetary science before we can commit to a conclusive answer concerning habitability. In this talk I will review the current knowledge about exoplanets and what are, in my view, the necessary steps to be taken in the future to address the question of planetary habitability.

Short Summary

The number of discovered planets located at the right distance to the star to host some liquid water is increasing by the day, are those objects really habitable or inhabited?

It appears we need to progress further in the understanding of non-habitable worlds before we can commit to a conclusive answer concerning habitability.