Towards a chemical survey of exoplanets

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Since the discovery of the first "exoplanet" about thirty years ago, about 6000 exoplanets have been discovered in distant solar systems, with many surprising planets and planetary systems, often very different from our own. A suite of ground-based and space telescopes are currently in operation or will be launched within this decade to discover more exciting planets and unveil their nature: what are they made of? How did they form? What is the weather like there? Are they habitable?

The Ariel space telescope, to be launched in 2029 as part of the ESA Science Programme, is the first mission dedicated to the determination of the chemical composition of hundreds of exoplanets, enabling planetary science far beyond the boundaries of the Solar System.

Finding out why these new worlds are as they are and what is the Earth's place in our galaxy and –ultimately– in the Universe, is one of the key challenges of modern astrophysics. The Ariel mission will bring a fundamental contribution to addressing this challenge, as I will illustrate in my talk.