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Towards the characterization of planet-host stars with WST from future missions: the case of Ariel

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Most of our current understanding of planet formation mechanisms is based on the correlations of stellar parameters with planet frequency and planet properties. In the advent of new missions dedicated to planet detection in vast numbers, the precise and uniform characterization of the host population is crucial. The WST is the ideal instrument to observe planet hosts from Gaia (tens of thousands planets expected in 2030), Nancy Grace Roman Space Telescope (tens of thousands planets), and PLATO (a few thousand). High-resolution spectroscopy is key to infer stellar parameters and abundances of elements important for planet formation. The WST with its wide wavelength coverage, high resolution (R~40000), and MOS capabilities is suited to fulfill this goal in particular for the thousands of faint hosts which cannot be followed up in high resolution by other facilities.

In this talk, I will present the strategy for the characterization of planet hosts to be observed by the Ariel space mission. This work combines ground-based observation campaigns and detailed spectroscopic analysis techniques in high resolution for a sample of 358 planet hosts so far. The lessons learnt from the synergy between the Ariel mission and ground-based spectroscopic facilities for the planet-host characterization can also be applied to WST.

Our analysis furthermore, reveals the connection of planetary properties with the different Galactic disc populations. In particular, we find that giant planets are more frequent around more metal-rich stars that belong to the Galactic thin disc, while lower-mass planets are found in more metal-poor environments and are more frequent in the thick disc, thus orbiting older stars. Our results highlight the importance of Galactic chemical evolution, although often overlooked, on the current distribution of planets.

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