



Contribution ID: 18

Type: **Invited review talk**

Stellar Activity as a Limiting Factor for the Discovery and Characterisation of Exoplanets

Thursday, January 23, 2025 4:00 PM (25 minutes)

Extreme-precision radial velocity (RV) instruments (e.g., ESPRESSO), offering 10 cm s^{-1} stability, and space telescopes (e.g., JWST), attaining relative flux uncertainties of 10 ppm, are becoming a reality. Such precision is, in principle, sufficient to enable the discovery and characterisation of small rocky planets, including true Earth analogues. However, the intrinsic variability of stellar hosts can overwhelm the instrument error and become the dominant source of uncertainty. An ambitious, comprehensive effort to model and correct for stellar activity effects must therefore be undertaken if we wish to explore the realm of exo-Earths. In this talk, I will review the current understanding of the impact of stellar activity on planet detection and characterisation, as well as some of the most promising efforts to decontaminate RV and transmission spectroscopy data. I will specifically discuss our approach, which is based on the unique combination of a physical model and contemporaneous multi-technique monitoring. The SPOTLESS project will implement this methodology by building a realistic stellar activity simulator and developing correction strategies using, for example, machine learning algorithms and direct inversion. With ongoing efforts, we should be able to attain new, challenging exoplanet RV discoveries and unbiased transmission spectra.

Contribution Type

Theme

Solar - Stellar Connections

Primary author: RIBAS, Ignasi (Institut d'Estudis Espacials de Catalunya (IEEC) & Institut de Ciències de l'Espai (ICE, CSIC))

Presenter: RIBAS, Ignasi (Institut d'Estudis Espacials de Catalunya (IEEC) & Institut de Ciències de l'Espai (ICE, CSIC))

Session Classification: Stellar Activity as a Limiting Factor for Characterising Exoplanets