MACHINE LEARNING FOR ASTROPHYSICS
2ND EDITION CATANIA, 8-12 JULY, 2024

Contribution ID: **207** Type: **Oral Presentation**

Reducing stellar noise in exoplanet observables using machine learning

Friday, 12 July 2024 15:10 (20 minutes)

The quest for life beyond the Solar System is one of the most thrilling endeavors of our time. Most of the 5600 exoplanets already detected have not been directly observed; instead, we heavily rely on indirect methods such as the transit or radial velocity technique. These methods are already sensitive to discovering Earth twins or detecting so-called biomarkers during a transit in the planetary atmospheres using space-based telescopes like the JWST or ARIEL. However, they are also highly sensitive to stellar activity manifested in magnetic phenomena such as dark spots, bright faculae, or granulation patterns, which can subsequently diminish, mimic, and even hide planetary signals. We use our state-of-the-art StarSim code to model stellar exoplanet observables, to feed neural networks, and to thereby predict the stellar contributions to exoplanet observables. In a first paper, we were able to reduce this stellar noise down to 4.5% for our model data and 10% for observational data of two test stars. I will present our approach, explain the recent results, and outline its capability to advance the most important issues of modern exoplanet science.

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

Session Classification: Solar Physics / Exoplanets