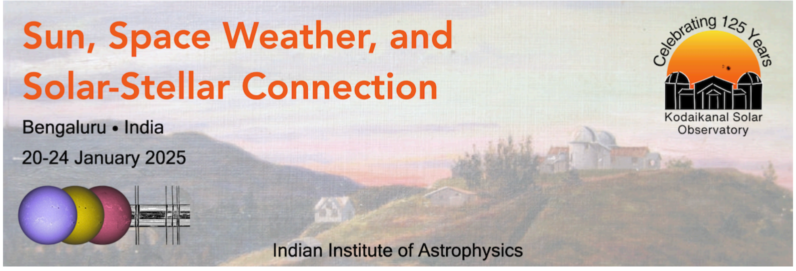


Contribution ID: **196** Type: **Poster**

# Pushing the boundaries of planet detection in the RV method

Radial velocity measuring instruments are nearing the precision needed for detecting Earth-like exoplanets, yet a new challenge emerges the star's own fluctuations. Disentangling the signatures of spurious radial velocity changes because of photospheric fluid flows is a complicated, multidimensional problem. Traditional methods, though partly successful, haven't fully tapped into the spectrum's hidden information. Identifying hidden patterns and exploiting higher-order correlations is where machine learning algorithms shine. We used the NEID solar data observations spanning the period 2020 to 2022 for training the network and for the injection recovery tests. During this period, the stellar jitter had an r.m.s. of 1.77 m/s. We show our ML algorithm can recover planetary signal periods and semi-amplitudes between 65-95 cm/s in semi-amplitude, with high accuracy(>76%), for temporally shuffled solar spectra. Even with real solar noise and aperiodic observations, our ML algorithm adeptly handles signals as low as 65 cm/s. We also present a method to use ML to de-correlate solar rotation from the Keplerian signal Period prediction algorithm, while preserving the temporal order of solar data, demonstrating AI's potential in EPRV research.

## Contribution Type

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## Theme

Solar - Stellar Connections

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