A fully-Bayesian model for RV extraction

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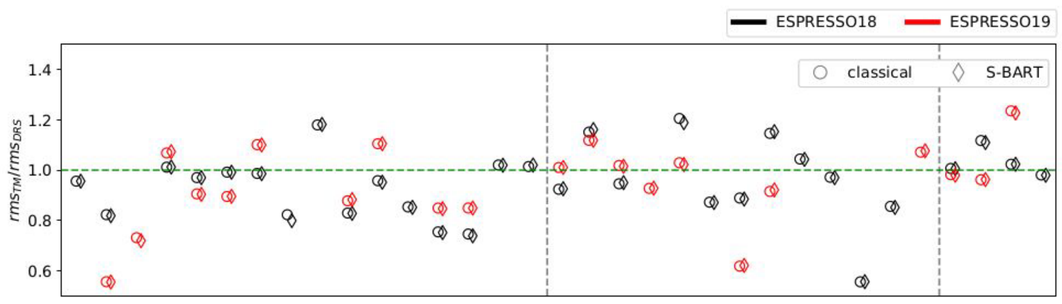
s-BART pipeline

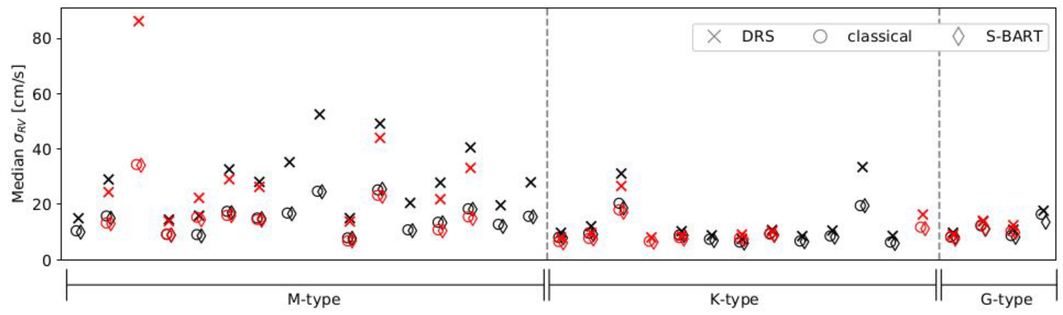
- s-BART (Silva+2022) recasted a classical template matching algorithm within a Bayesian framework, introducing:

  1) A RV-shift that is common to all spectral orders, reflecting the expected signals from orbiting companions;
  2) A marginalization of the continuum level;
  3) A consist method to characterize the RV posterior distribution

- It is publicly available, accepting spectra from:
  - ➢ ESPRESSO;
  - ➢ HARPS;
  - ➢ Soon for HARPS-N and CARMENES.

- Application to ~3000 ESPRESSO observations reveals decreased scatter for M- and K-type stars and improved RV uncertainties:

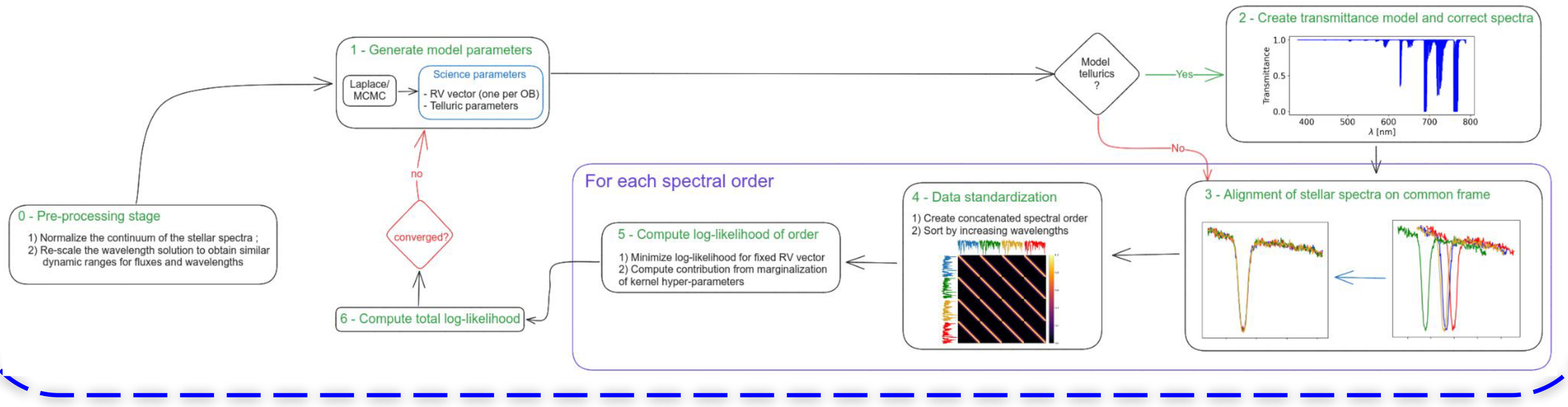




- RV pipeline for Faria+2022, Palethorpe+2024, Passegger+2024, Suárez Mascareño+2024, and a few others in prep/submitted.

A move towards a fully Bayesian model

- Modelling the stellar spectra under a probabilistic framework would remove the need of a stellar template and allow the inclusion of time-dependency on the model;
- Simultaneous modelling of RVs and tellurics would allow to account for the uncertainties in this process;
- The implementation of a simplified version of such model already allows for the retrieval of m/s signals, showing promise for further improvements.



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sBART