Next generation peakbagging tools for Plato.

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Abstract

To fully leverage the data from the thousands of solar-like oscillators expected from Plato we need new methods for performing asteroseismic analysis. Here we present the pipeline proposed for the Plato asteroseismic analysis. This probabilistic method can produce generative models of the spectra of solar-like oscillators for main sequence, sub-giant and low-luminosity red giants. Our method accurately accounts for the frequency dependent coupling between each combination of gravity and pressure dominated modes through the different evolutionary phases. This approach significantly increases the complexity of the spectrum models, and we therefore employ a PCA-based dimensionality reduction method to simplify the sampling process. This utilises the large quantities of previous measurements of many of the model parameters, to construct a prior probability density in a lower-dimensional latent space. Extending this beyond Plato, this methodology can allow us to build more elaborate models of solar-like oscillators, such as including treating rotation and magnetic field effects.

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