Towards robust estimation of stellar ages using asteroseismology

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ABSTRACT

Accurate stellar ages are vital for understanding stellar evolution and galactic dynamics, and we aim to improve their precision by selecting models that best represent each star's core properties. Asteroseismology probes the stellar interiors via surface oscillations enabling precise determination of fundamental properties, i.e; radius, mass, and age,.

- $R \propto \frac{\Delta\nu}{\nu_{\max}} \cdot T_{\rm eff}^{1/2}$
- $\tau = f(\Delta\nu, \nu_{\max}, [\mathrm{Fe/H}],$ *etc)*

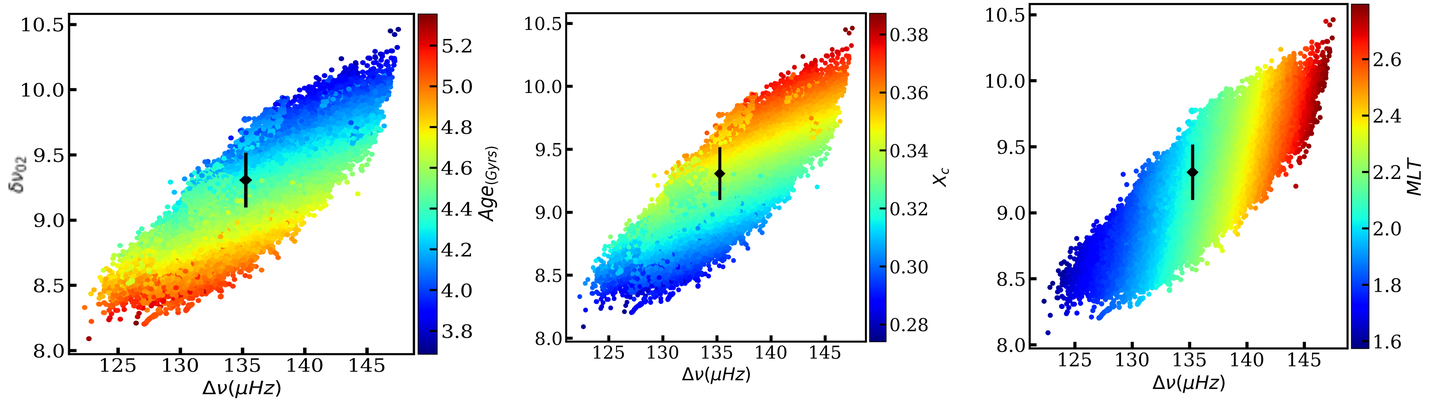
As part of a broader study of benchmark stars, we present results for the Sun and 16 Cyg A, showcasing our model selection method for robust stellar age estimation

$$\Delta\nu = \nu_{n+1,0} - \nu_{n,0} \quad ; \quad \delta\nu_{02} = \nu_{n,0} - \nu_{n-1,2}$$

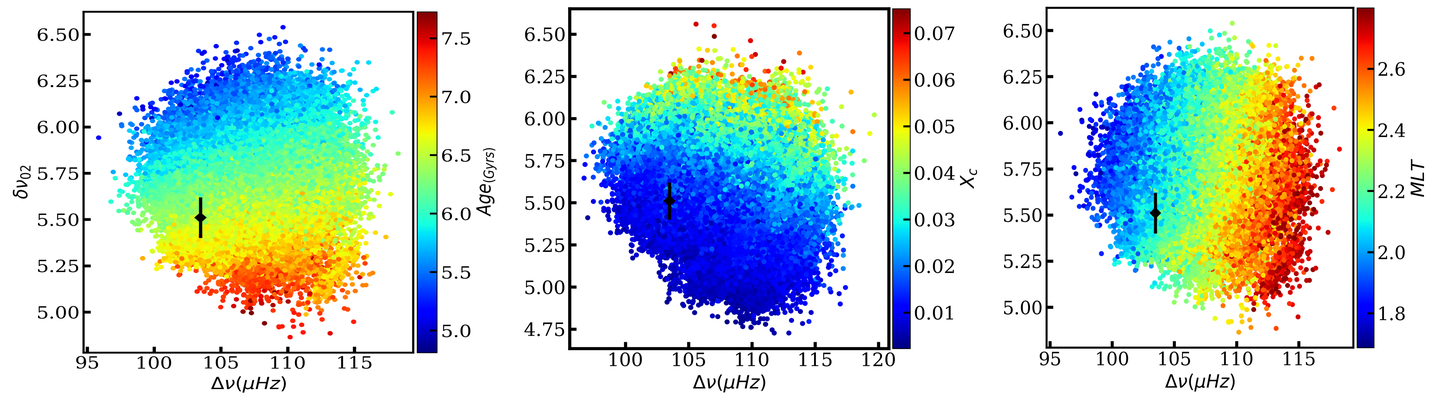
Work flow

RESULTS

THE SUN



16 CYG A



TAKEAWAY POINTS

- Preliminary results demonstrate that only a specific set of best models correctly fit the "true" star properties like age, Xc and MLT.
- Future work includes expanding to a larger ensemble of benchmark stars.