A leap towards precise ages of solar-like stars in the era of PLATO

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➤Asteroseimic forward modelling offers great precision in determining stellar mass and radius, but age estimates continue to show relatively higher uncertainities (up to 15%).

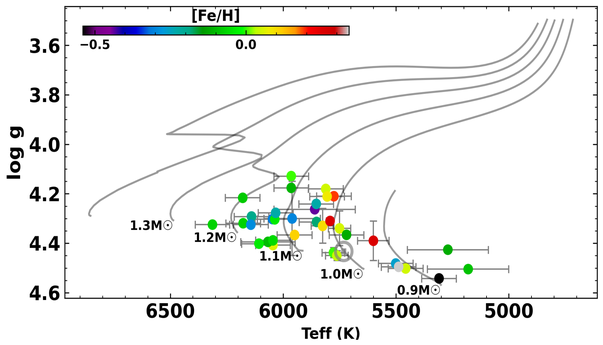
➤ The small separation (δν) and large separation (Δν) are sensitive to core structure and evolutionary stage, therefore we utilise them to improve stellar ages.

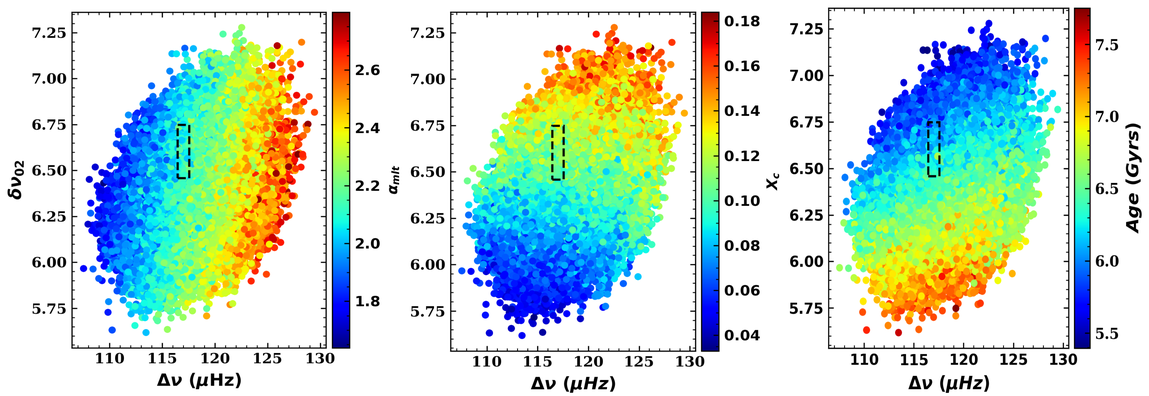
$$\delta\nu_{02}(n) = \nu_{n,0} - \nu_{n-1,2}$$
$$\approx (4l+6)D_0$$

where;

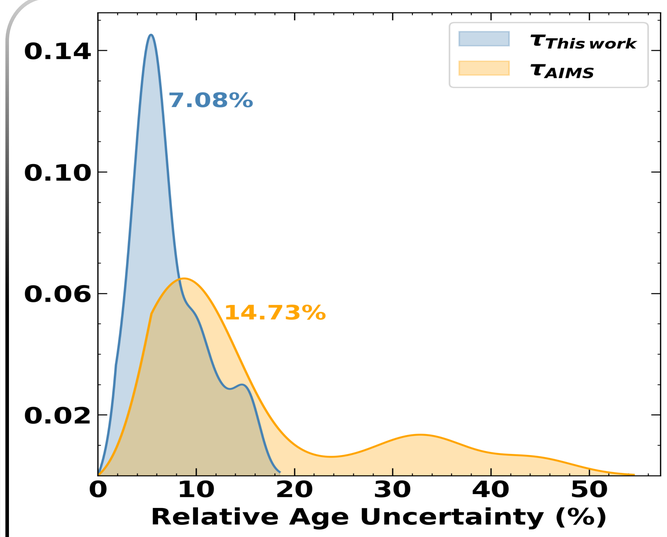
$$D_0 \approx \frac{1}{4\pi^2 n_0}\int_0^R \frac{dc}{dr}\frac{dr}{r}$$

Stellar sample.

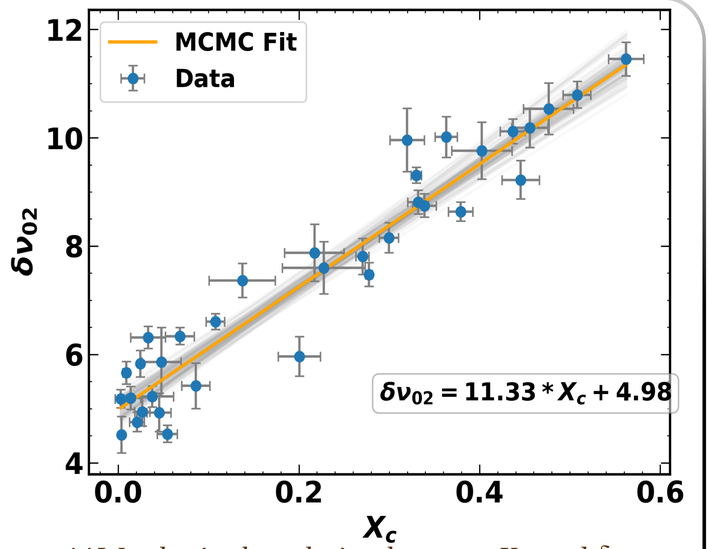




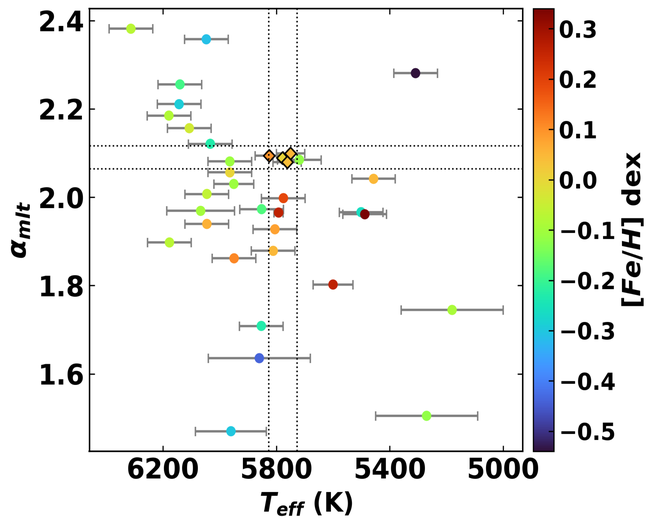
*** $\delta\nu_{02}$ vs $\Delta\nu$ is able to disentangle the distribution of best-fit models according to α_{mlt}, Xc, and age.***



We achieve a precision of <10% in stellar ages.



We obtain the relation between Xc and $\delta\nu_{02}$ for a sample of MS stars.



This shows that a single α_{mlt} is not sufficient for solar-type stars except for solar twins .

References

Campante et al.(2024), A&A, 683, L16

Creevey et al.(2017), A&A, 601, A67

Regner T et al.(2014), MNRAS, 480, 805

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