**Dan Huber: Solar-like oscillators with TESS**

Kepler sample is biased towards sun-like stars, not many subgiants.

It’s also pretty faint--- the dwarfs and subgiants are all quite faint.

ATL only focused on subgiant and MS stars, FFI cadence is fine for the others. Low detection probabilities for low temperature ~5500K.

~50% of the stars we’ve looked at are oscillating (from the ATL).

Why isn’t this close to 100%? Wasn’t expected either way. Activity suppresses seismic mode visibility. We can’t know this apriori. Inaccurate stellar parameters (e.g. assumed stellar mass) means our predictions can be off. Precision is worse than expected, specifically for bright stars (>Tim White’s talk).

Note that Kepler’s detection fraction was 30%!

TOI-197 (see Ashley’s talk Friday).

NuIndi has had detection of oscillations from the ground (Bedding+2006), is a benchmark star in terms of its metallicity. TESS hugely improves the data.

Ashley & Warrick found oscillations in Zeta Tuc and Alpha Mensae. See Ashley’s badge.

The bulk of detections in the ATL can easily be accommodated with 10-minute cadence, no need for 2 minute cadence on those stars. The 2 min cadence instead is more interesting for more solar-like stars. Note that the stars Dan is showing are the top 2000 ATL stars, not the entire yield.

20sec cadence is really needed for the sun-like stars, as you want to avoid the frequency attenuation.

**Marc Hon: First Results of the solar-like oscillator yield from TESS FFIs**

Ran SLOSH on TESS FFI stars.

At values near the Red Clump, SLOSH overestimates logg by about 10%.

88% of SLOSH log(g)’s are within 2 sigma of HERMES log(g) (Sharma+17).

This work is a culmination of work done by the T’DA group. There are 12,080 detections from corrected data at Tmag < 12.5. They’re currently investigating false positives and missing stars. SLOSH delivers 4% estimates to log with 10% offset with regards to spectroscopy. Why?

**Tim White: Bloody Bright Stars**

The Kepler smear campaign provides LCs for 102 stars.

There’s no background corrections for really bright stars.

You don’t have to resort to Halo photometry, as it throws away a lot of data, but in some cases its better than not using it.

Got awesome peakbagging of ß Hydri. Alpha Cen has a numax around 2500, also sorta visible in TESS, but not really.

Lots of unique challenges for really bright stars. We’re overcoming these challneges in the TASOC pipeline and producing light curves for these targets.

**Warrick Ball: What sort of variable is HR2562**

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**Earl Bellinger: Tests of asteroseismology benchmark stars with TESS and SONG**

Studying the TESS power spectrum of delta Eridani.

Theoretical velocity at the photos phere due to one oscillation mode nicely agrees with the measured numax of the star.

Evolutionary modelling in the star agree on a central density (linear relation btween mass and radius) but disagree on individual measurements of mass, radius, age and base of the convective zone.

Predicting mode frequencies struggles at low frequencies. What about our model structure is incorrect? The answer is looking at the kernel functions.

With 16 Cyg AB last year the uncertainties on the inversion analysis were too large to say conclusively why they disagreed with the models. KIC6225718 is basically unevolved delta Eri. On this star they find which averaging kernels work. Theoretical model has too high of a speed of sound in the deep interior, and too small further out (~0.3r/Rstar). It doesn’t matter which code or parameters you use, there is still disagreement between observations and stellar structure.

For Delta Eri, they find the theoretical predicted sound speed is within 1% of the modelprediction. In the subgiant they are 2 orders of magnitude deeper than we can probe with the sun.

They control for changes in the composition with an additional kernel.

**Joel Ong: Structural and Evolutionary Diagnostics from Asteroseismic Phase Functions**

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**James Kuszlewicz: Why are evolutionary states important?**

Supervised machine learning:

Data -> Feature -> Algorithm (xgboost) -> Evo state classification.

This is ‘supervised’ because we already have the ground truths for these stars.

Trains the classifier on five evo state labels from Elsworth et al. (submitted).

Psi Squared is a measure of signal coherency/stochasticity.

Classifier performance drops slightly when we move down to the 27day dataset.

The classifier can just predict RC stars because they’re more common if you’re not careful. At the moment they’re not sure how to deal with this yet.

They achieve a >91% accuracy for all dataset lengths (and 92% for the longest data).

Note: They produce reliable class probabilities suitable to use as priors.

**Dan Hey: Forward Modelling of Pulsating Stars in Binaries**

At periastron, eccentricity of a binary orbit isn’t properly sampled. They need smaller segments, but segment size decreases frequency resolution.

Github maelstrom. Assigns pulsation frequencies to stars.

Searching for short period binaries. We optimiz model of a grid of orbital periods and checks the likelihood of the model at each period. This is verified using EBs or RVs.

EBs give you fractional radii and orbital inclination. With RVs and pulsations we get de-projected masses and fundamental radii. With Tempearture we get luminosity and distance (if we have a good extinction map).

KIC 8648356, has a single eclipse. Time delays can constrain the orbital period. Adding the maelstrom time delay model on top of the transit model let syou sample the entire orbit.

**Jean McKeever: Comparison between asteroseismic and dynamical masses and radii**

Several ways to find mass and radius.

KIC 9970396, eclipsing. Roughly solar mass star. Considering l=0,2 so far.

Compute grid of evo models (mesa + gyre)

Compute l=0,2

Evaluate goodness of fit with a chi squared.

Their masses are close to those from scaling laws but not in agreement with dynamical masses.

KIC 5640750, same technique, in general agreement with a range of masses presented in Themeßl+18. The former also fits nicely into the measurements of that star in Brogaard+2018.

New binaries in TESS would be useful in improving this. More modelling needs to be done to solve the problem, can we detect differences between asteroseismic and dynamically driven mass?

Possibly EB fit is wrong, but this would have wider implications.

**Natalie Themeßl: Is it time to retire the sun as a scaling star for RGB stars?**

Tried to calculate numax and deltanu reference values (instead of the solar values) using independent asteroseismic measurements of Mass, Radius. This is possible for **open cluster stars** and **eclipsing binaries.**

For a numax they use the Gaussian fit on the background. For delta nu, they peakbag the radial l=0 modes.

The comparison between the asteroseismic and dynamical stellar parameters shows us that for these 3 rg stars a lower deltanu reference would be favoured. This also works for cluster giants but this is still a work in progress. Do empirical reference values provide us with more precise references?

**Sanjay Sekaran: Detecting g-mode period spacings in EBs with pulsating components**

G-modes are semi equally spaced in period. Deviations due to rotation (slope) and chemical gradient (dips). Dearth of reported PS patterns in binaries. They seem to be overall underreported. Only 2 PS measurements are in eclipsing binary systems.

Not all stars in their sample will have G-modes. Visiually inspect residual periodograms. Classify before ground-based follow up.

Initially identified ased on density of g-modes. 89 stars with g-modes, 24 high density.

No particularly strong trends with frequency of gmodes as a function of orbital parameters.

Future efforts will model eclipses, perform modelling of best candidates, compare dynamical and seismic parameters and extend the sample to OB stars, to see if there is a mass dependence in their research.