

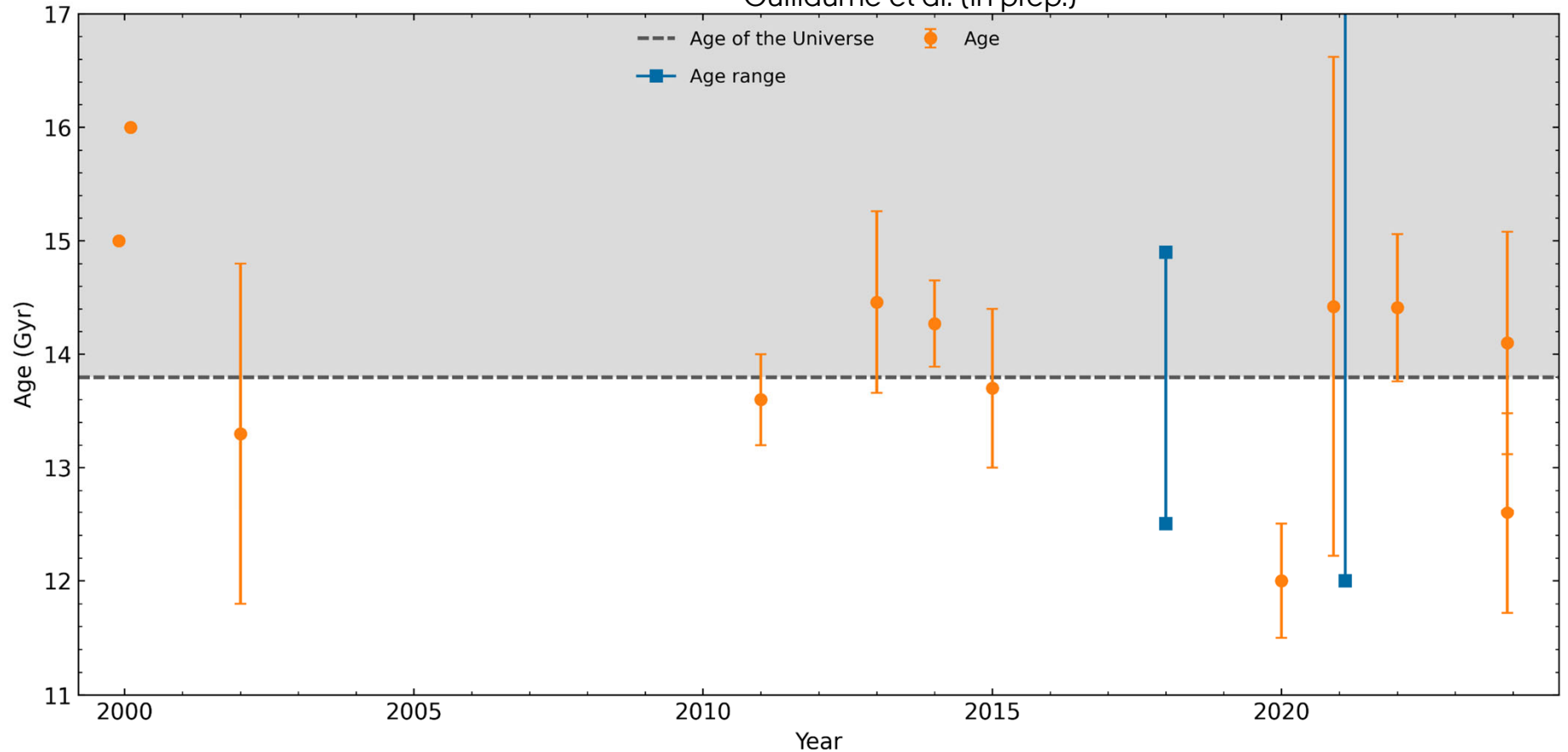
ASTEROSEISMIC ANALYSIS OF THE 'METHUSELAH' STAR (HD 140283)

Mia S. Lundkvist, Jens R. Larsen, Yaguang Li, Mark L. Winther,
Tim R. Bedding, Hans Kjeldsen, Tim R. White,
Martin B. Nielsen, Gaël Buldgen, Charlotte Guillaume,
Dan Huber, Prasad Mani and Frank Grundahl

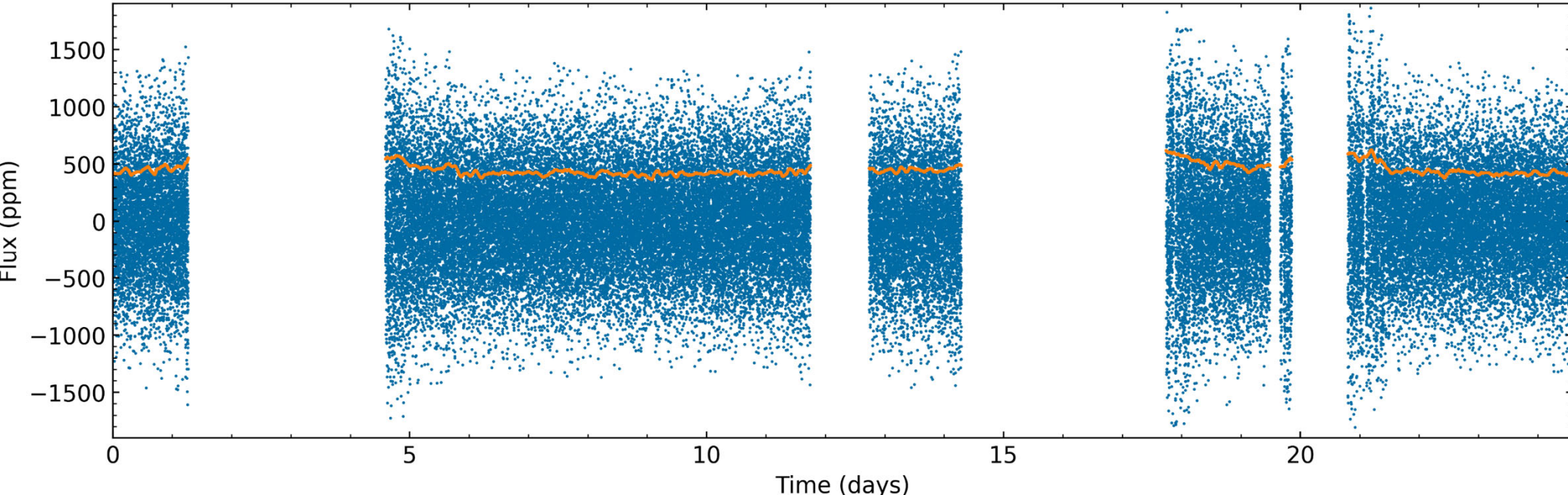


AGE ESTIMATES

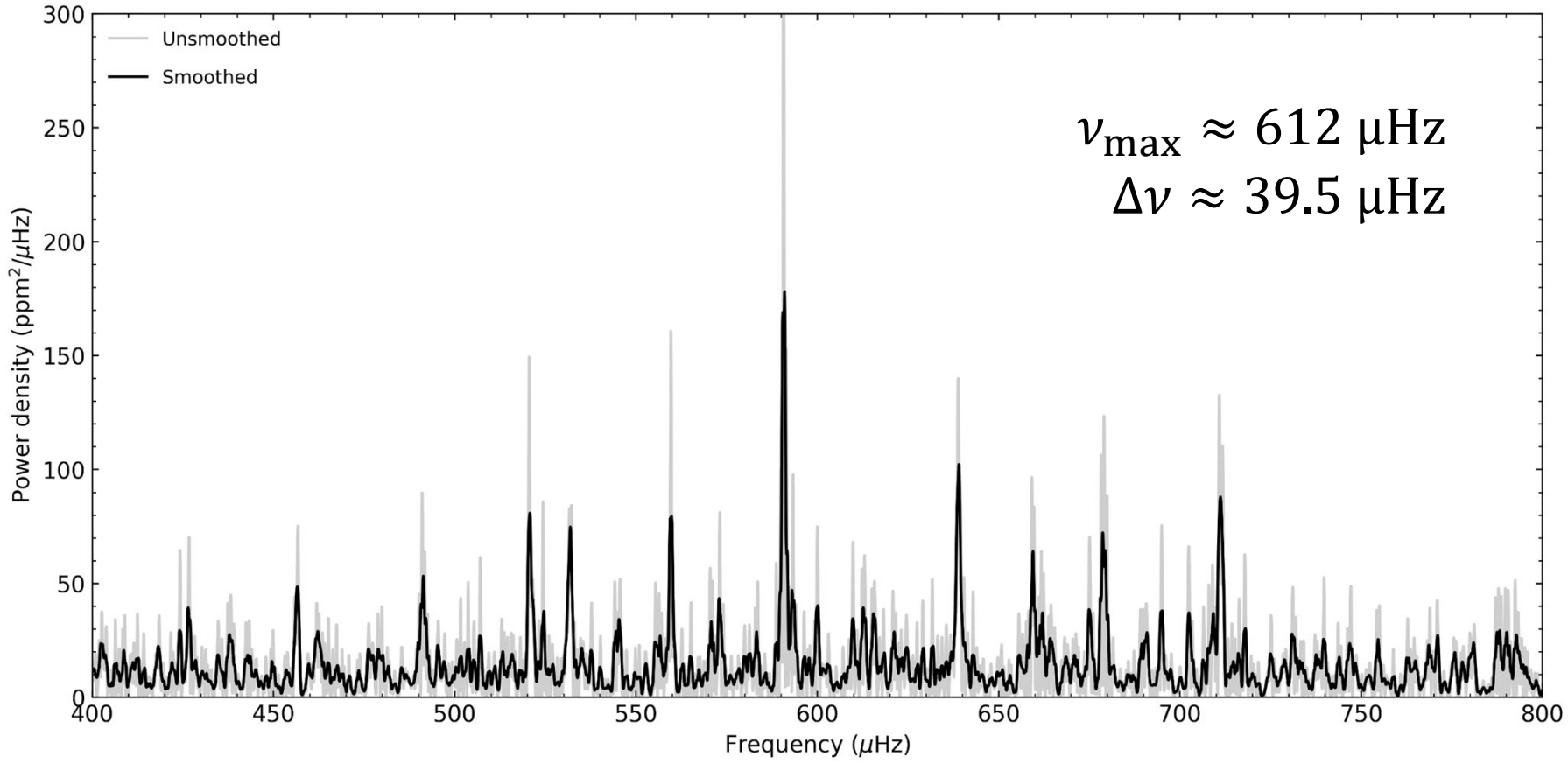
Grundahl et al. (2000), Vandenberg (2000), Vandenberg et al. (2002), Casagrande et al. (2011), Bond et al. (2013), Vandenberg et al. (2014), Creevey et al. (2015), Joyce and Chaboyer (2018), Chen et al. (2020), Sahlholdt et al. (2021), Tang and Joyce (2021), Plotnikova et al. (2022), Guillaume et al. (in prep.)



TESS 20-SEC TIME SERIES

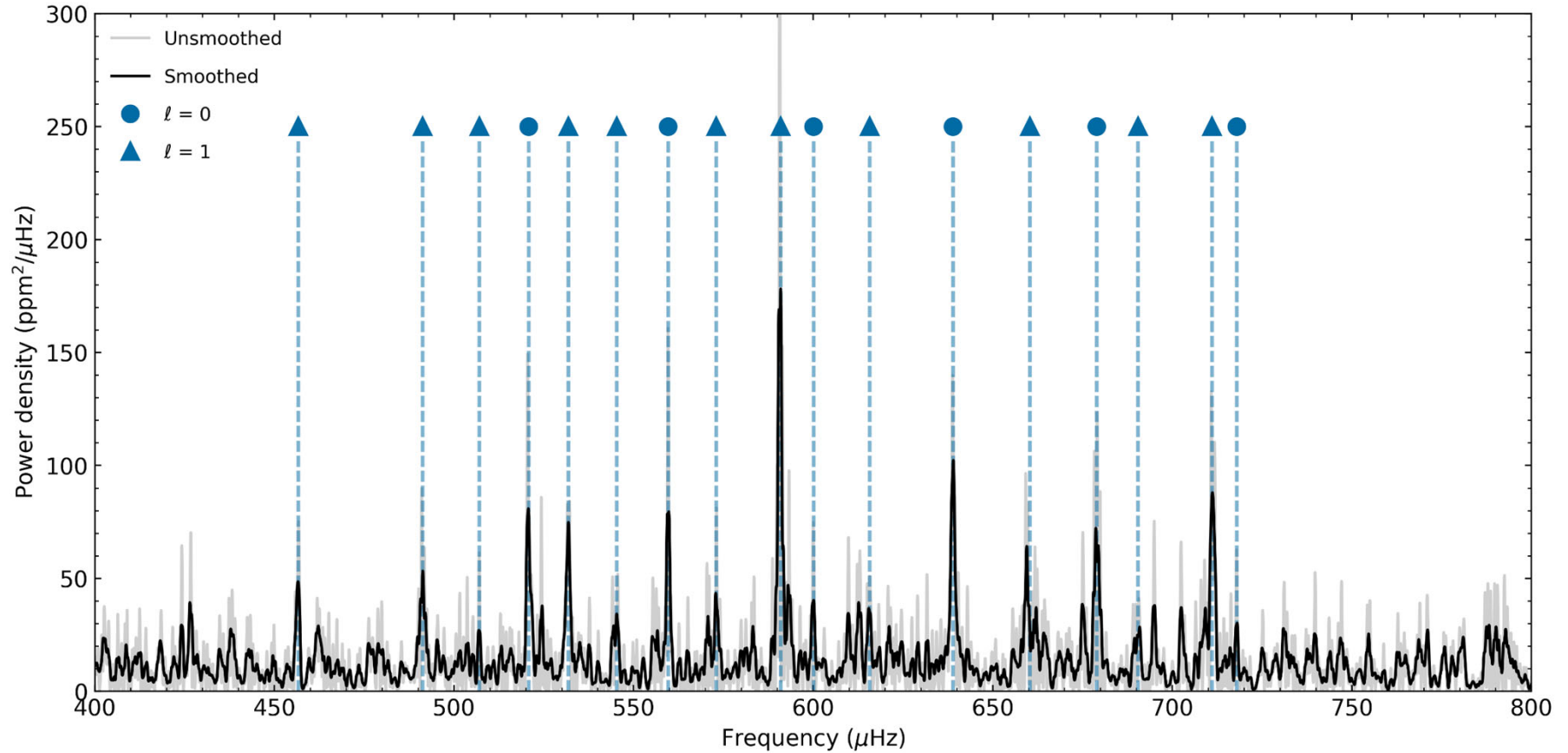


THE POWER SPECTRUM



THE FREQUENCIES

Nielsen et al. (2021)
Next talk by Yaguang Li
Kjeldsen et al. (in prep)



THE GRID MODELLING

T_{eff} and $[\text{Fe}/\text{H}]$ (Karovicova et al. 2020).

$R_{\text{int}} = 2.167 \pm 0.107 R_{\odot}$ (Karovicova et al. 2020, inflated errorbars).

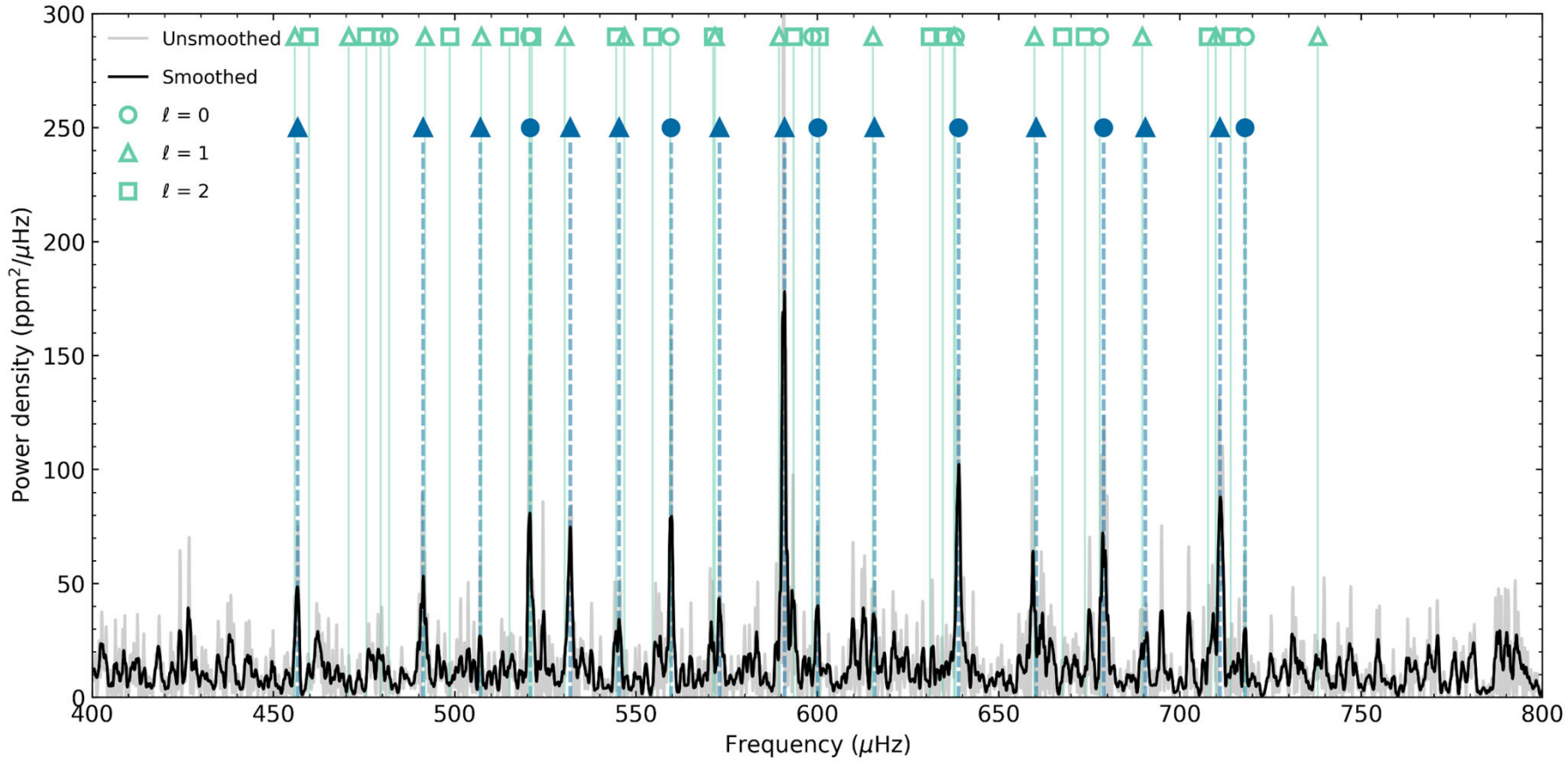
π , B_p , R_p and G (Gaia DR3).

17 frequencies.

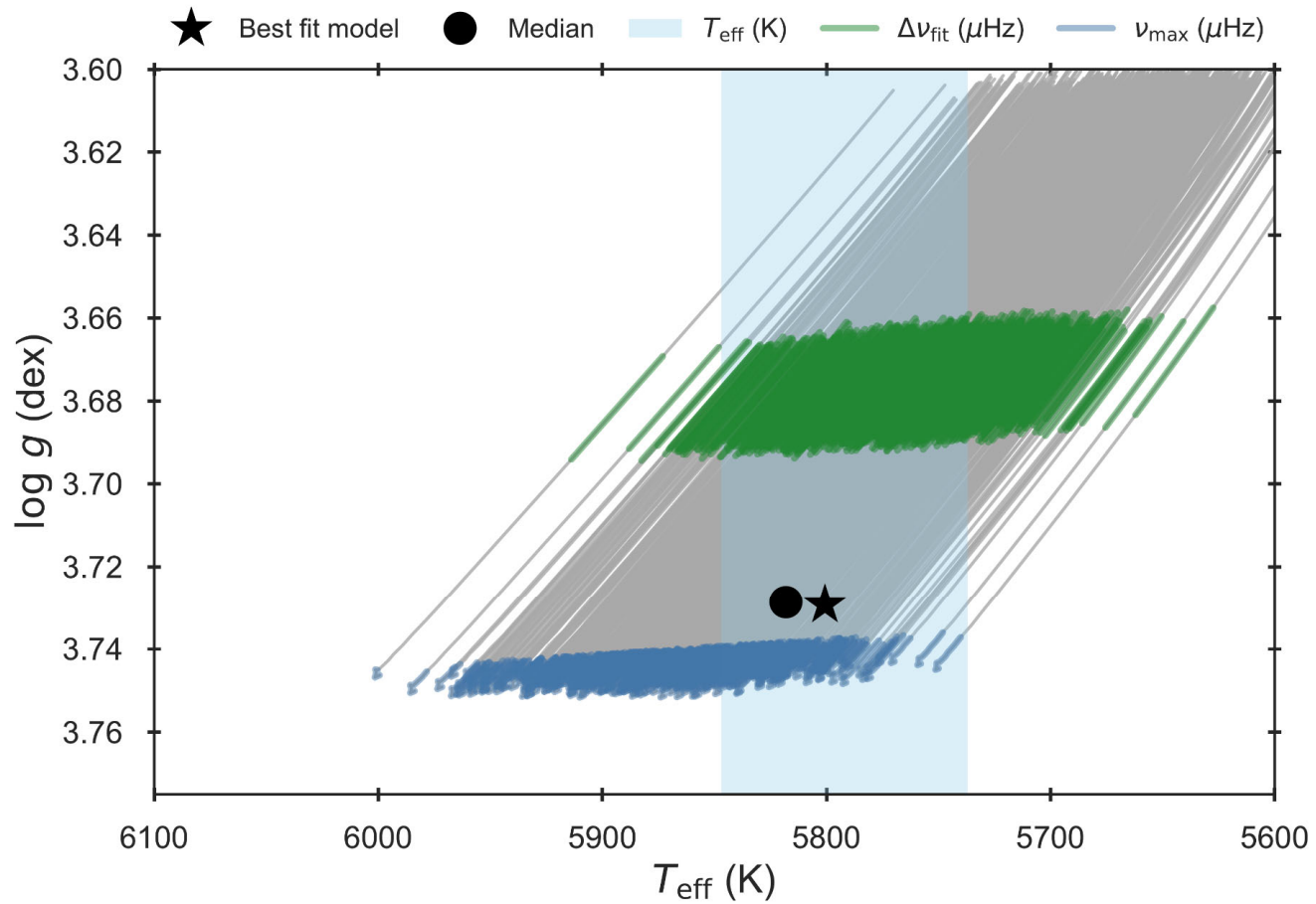


BASTA: Aguirre Børsen-Koch et al. (2022)

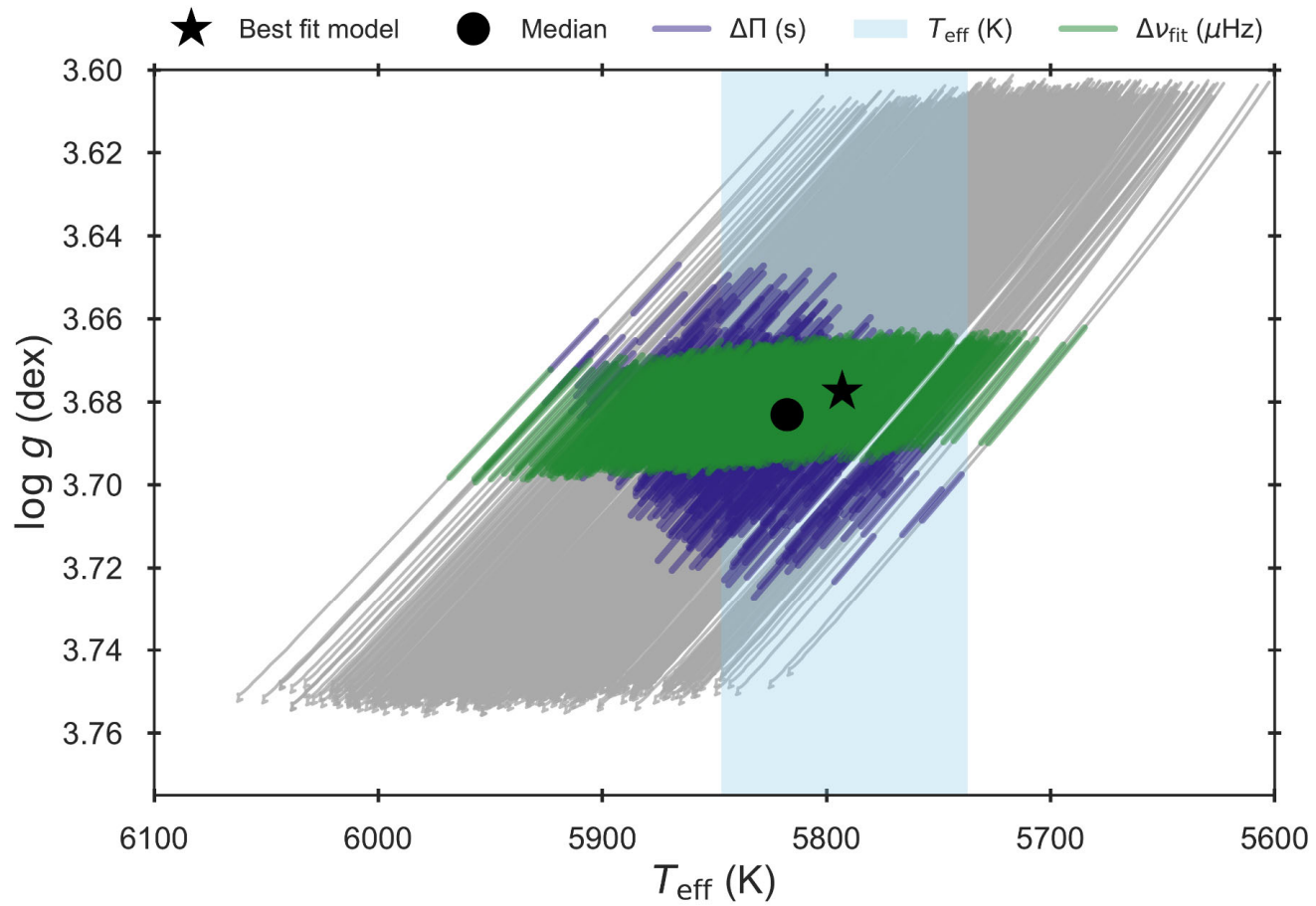
THE MODEL-FREQUENCIES



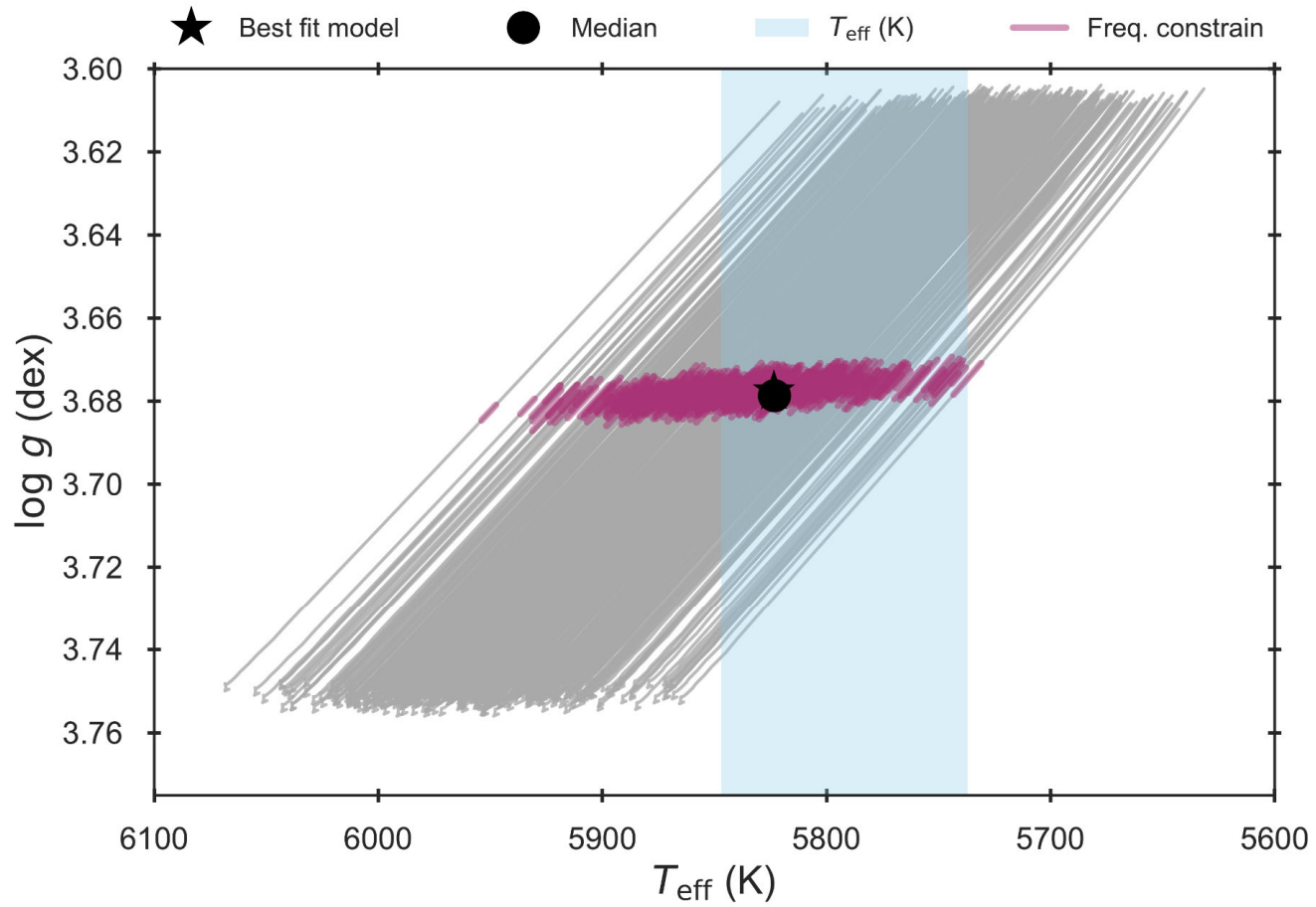
KIEL DIAGRAM



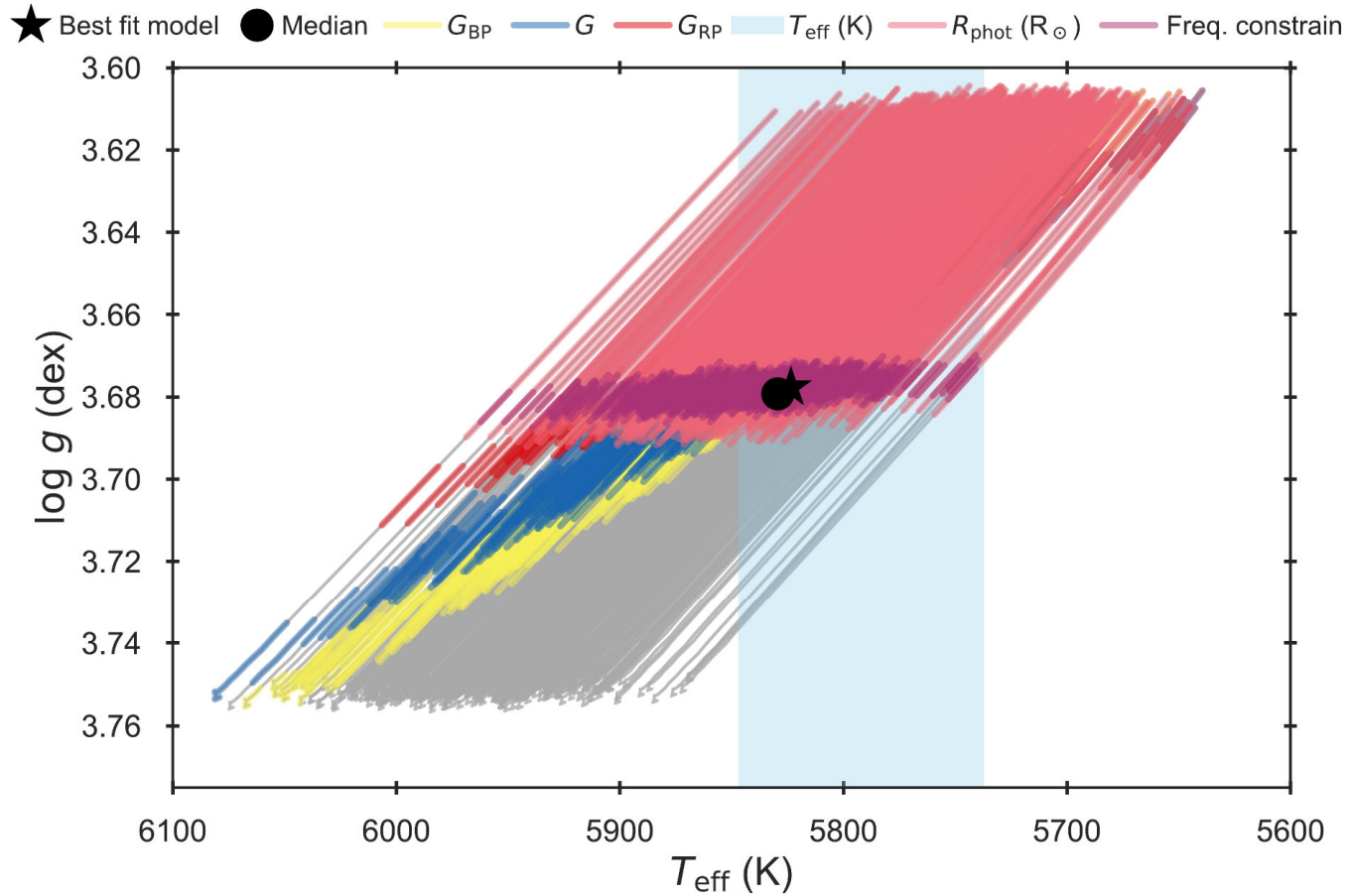
KIEL DIAGRAM



KIEL DIAGRAM

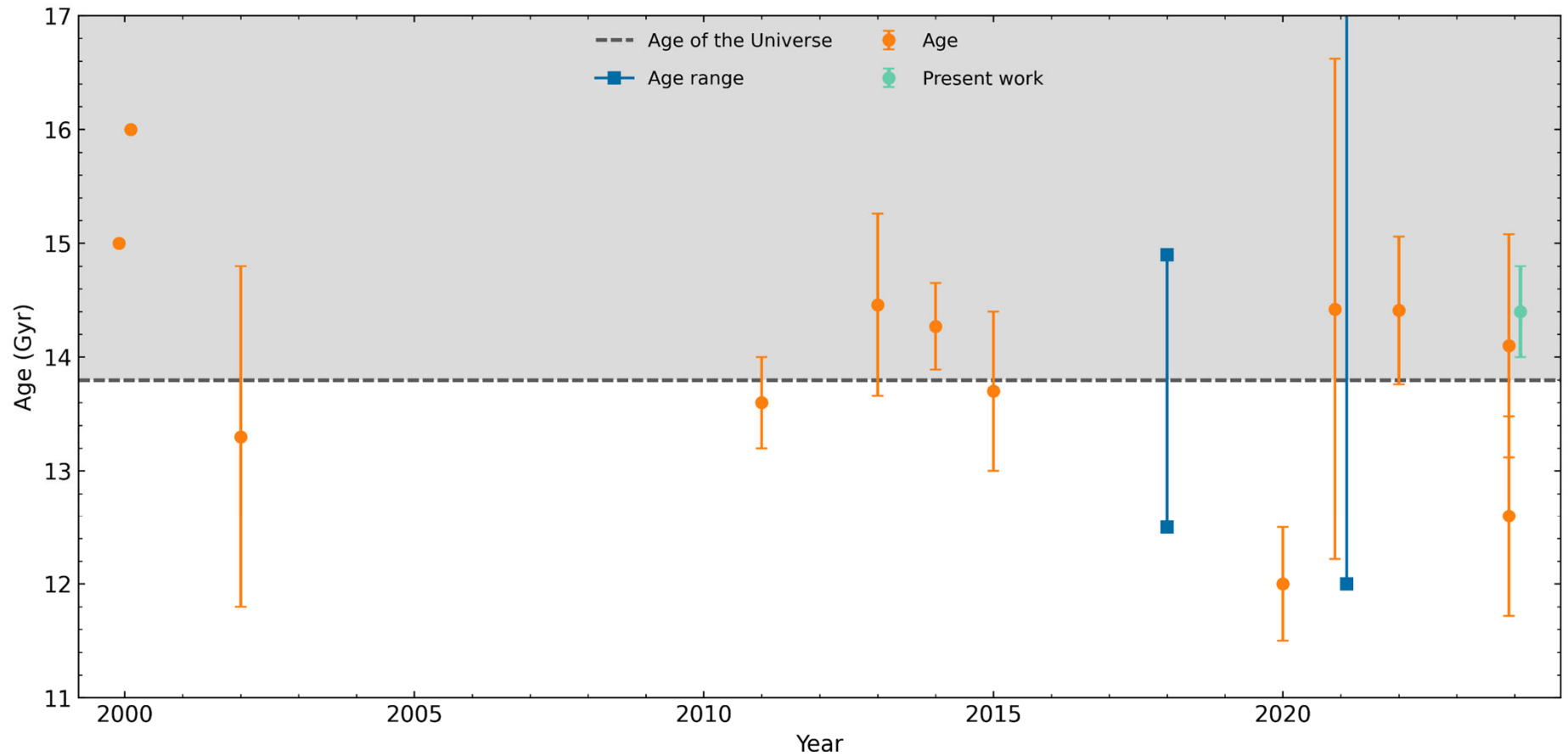


KIEL DIAGRAM



OUR AGE ESTIMATE

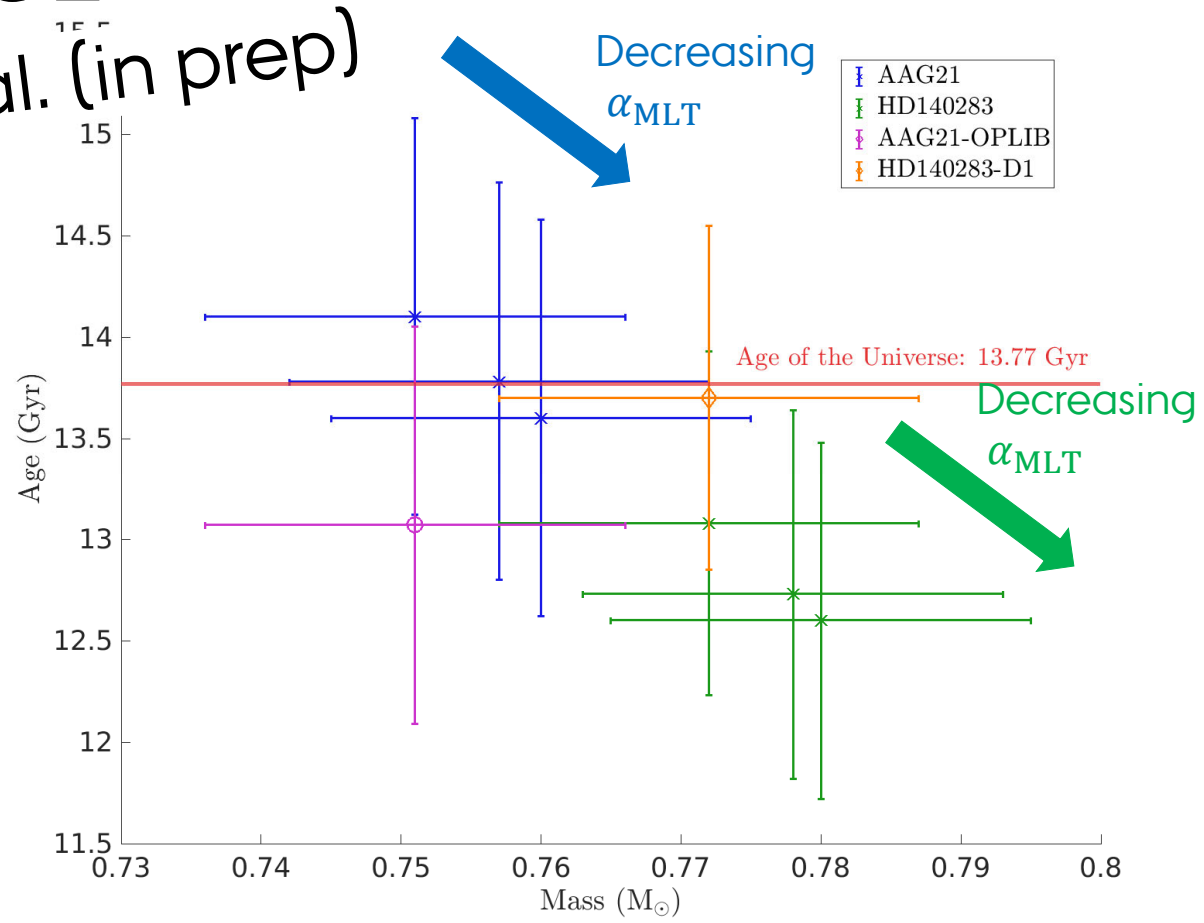
Age = 14.4 ± 0.4 Gyr



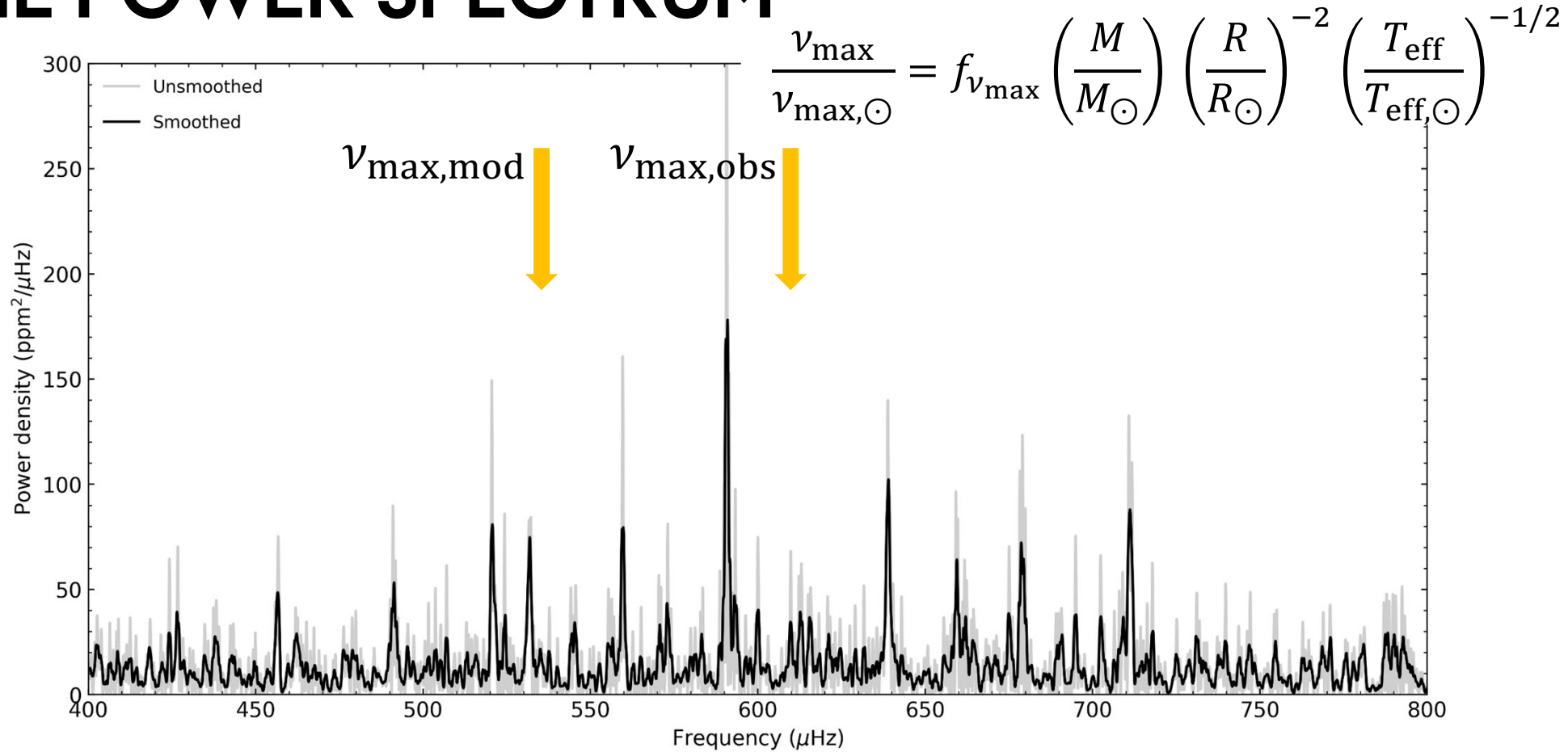
CHANGING THE AGE

Guillaume, Buldgen et al. (in prep)

- Scaled solar mixture
- Scaled solar mixture (other opacity table)
- Methuselah mixture
- Methuselah mixture (different mixing)



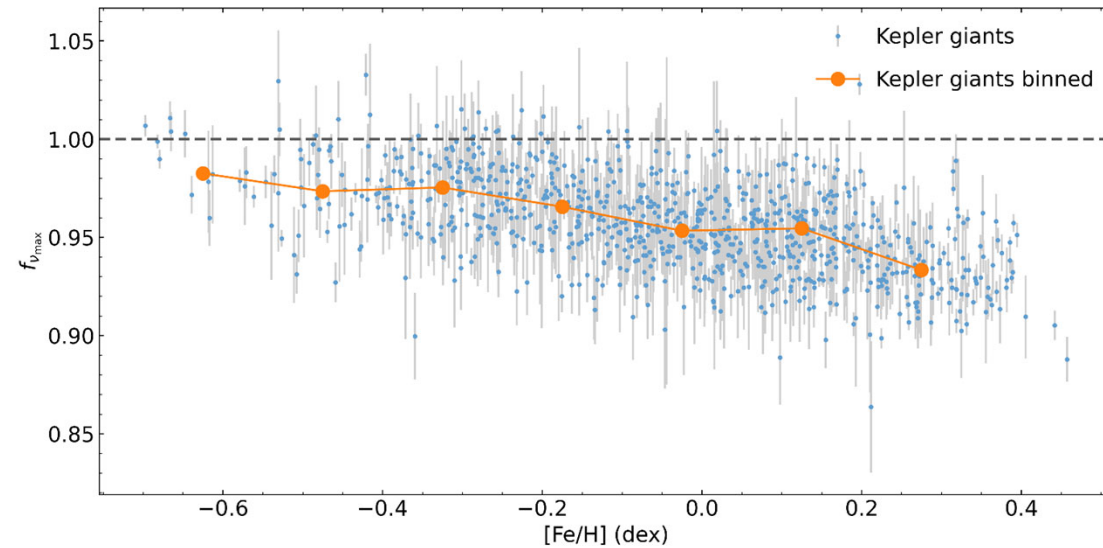
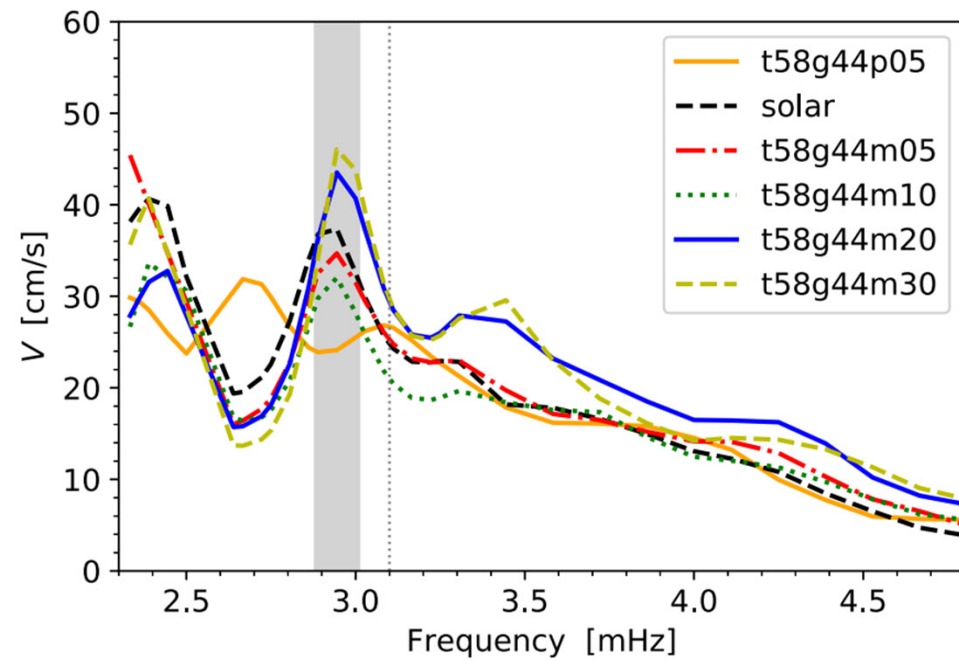
THE POWER SPECTRUM



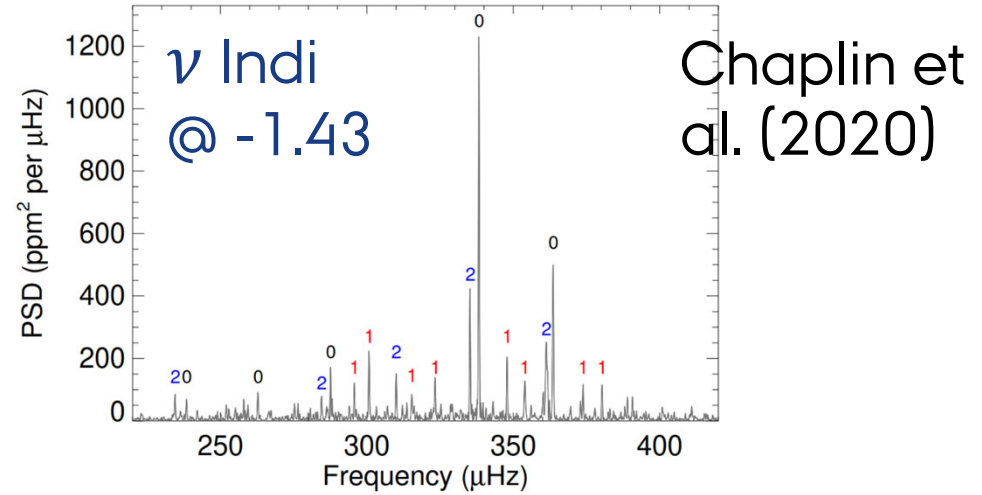
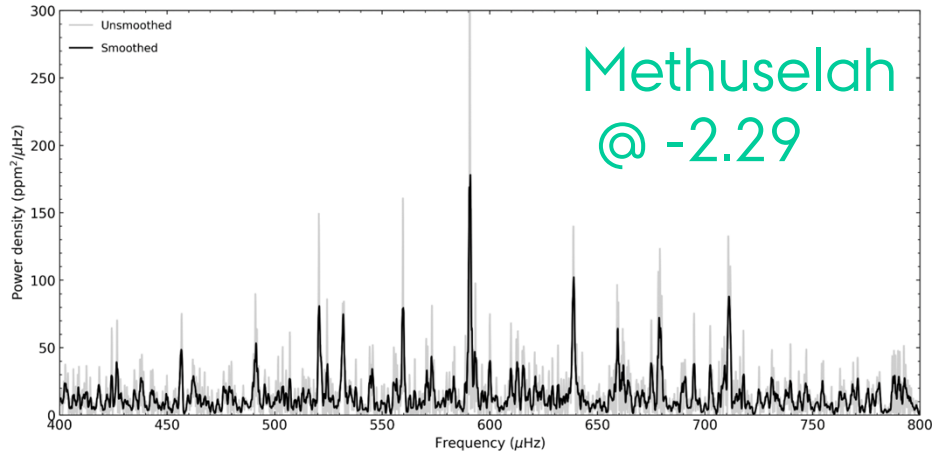
$f_{\nu_{\max}}$ AS A FUNCTION OF METALICITY

Yixiao Zhou et al. (2024)

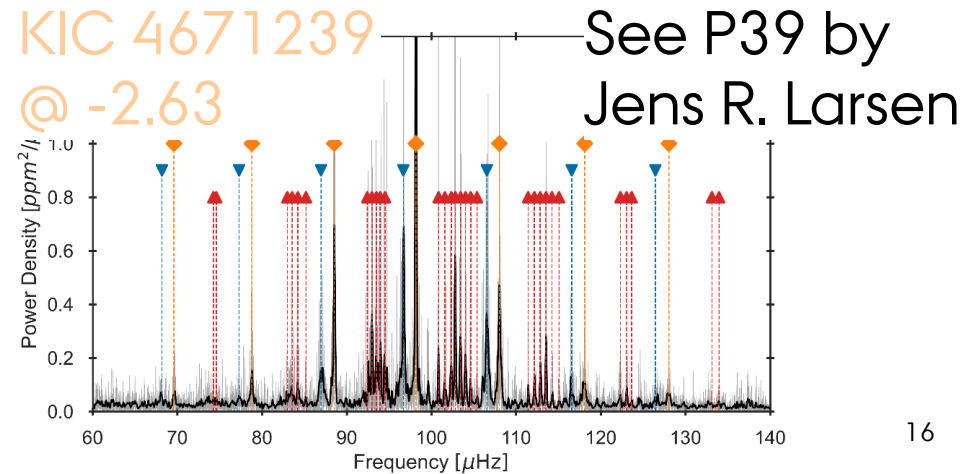
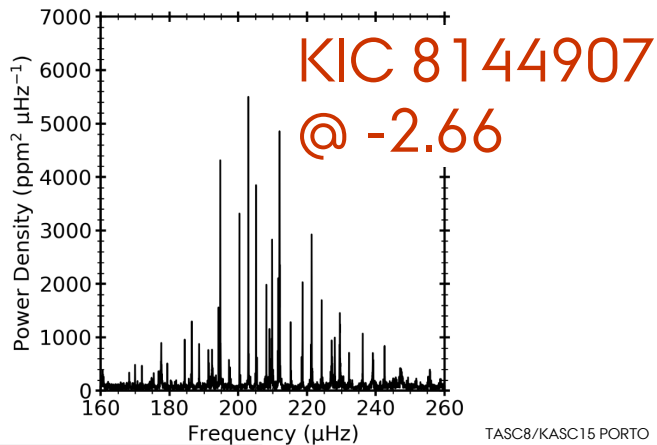
Yaguang Li et al. (subm.)



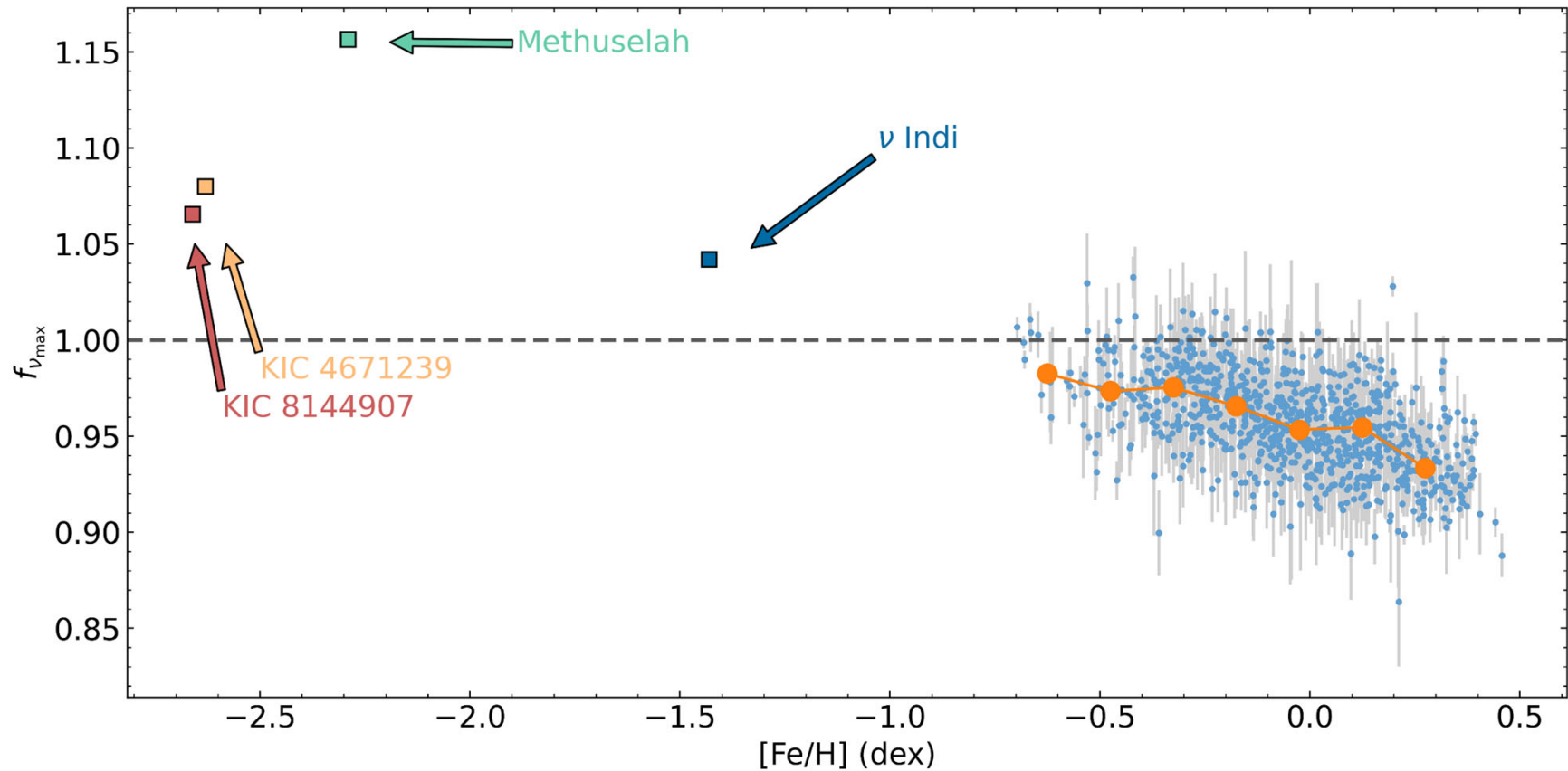
$f_{\nu_{\max}}$ AS A FUNCTION OF METALICITY



See Dan Huber's talk on Friday



$f_{\nu_{\max}}$ AS A FUNCTION OF METALICITY





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