

Poster CS20.5 - Weakened magnetic braking supported by asteroseismic rotation

Hall, Oliver; Davies, Guy R; van Saders, J.; Nielsen, Martin; Lund, M. N.; Chaplin, Bill; Garcia, R. A.; Amard, L.; Breimann, A. A.; Khan, S.; See, V.; Tayar, J.

DOI:

[10.5281/zenodo.4562478](https://doi.org/10.5281/zenodo.4562478)

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Document Version

Publisher's PDF, also known as Version of record

Citation for published version (Harvard):

Hall, O, Davies, GR, van Saders, J, Nielsen, M, Lund, MN, Chaplin, B, Garcia, RA, Amard, L, Breimann, AA, Khan, S, See, V & Tayar, J 2021, Poster CS20.5 - Weakened magnetic braking supported by asteroseismic rotation. in *The 20.5th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (CS20.5), virtually anywhere, March 2-4, 2021*. Zenodo. <https://doi.org/10.5281/zenodo.4562478>

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**WEAKENED MAGNETIC BRAKING
SUPPORTED BY ASTEROSEISMIC
ROTATION RATES OF KEPLER DWARFS**

Oliver J. Hall, Guy R. Davies, Jennifer van Saders, Martin B. Nielsen, Mikkel N. Lund, William J. Chaplin, Rafael A. García, Louis Amard, Angela A. Breimann, Saniya Khan, Victor See, Jamie Tayar

*In press, to be published in April.
Feel free to ask me about results
here, on Twitter or via email!*

asteronomer.com
github.com/ojhall194
@asteronomer

INTRO

- The **rotation** of stars **slows down** as they **age**, at a rate that is a function of **colour**.
- We can calibrate this ‘**gyrochronology**’ relation to help us estimate stellar age.
- van Saders+16 showed that some **old stars** stop slowing down at a certain point. This effect is referred to as **weakened magnetic braking**.
- Asteroseismology can provide **independent rotation rates** to test this hypothesis at all ages (up to 12.8 Gyr in our sample).

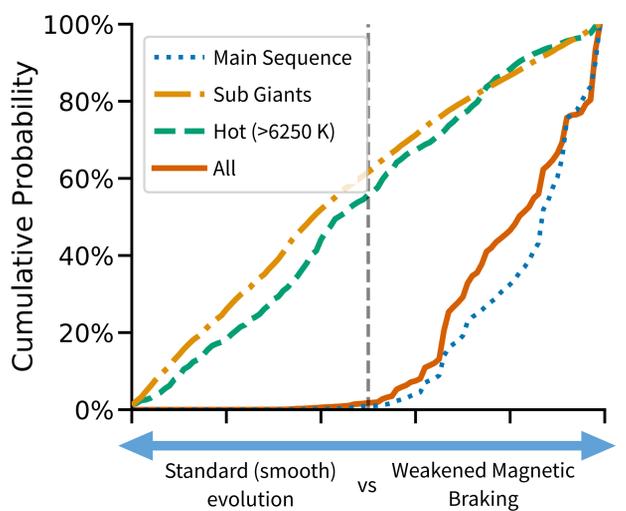
METHOD

- We use the **Davies+16, Lund+17, Silva Aguirre+15,17** samples for their ages and locations of individual mode frequencies.
- We obtain **new** rotation periods for **91 stars** by fitting a holistic model to modes of oscillation, treating the mode frequencies as **latent variables**.
- Using a **hierarchical mixture model**, we compared our samples to two population models in mass, temperature, **age, rotation** and **metallicity**.

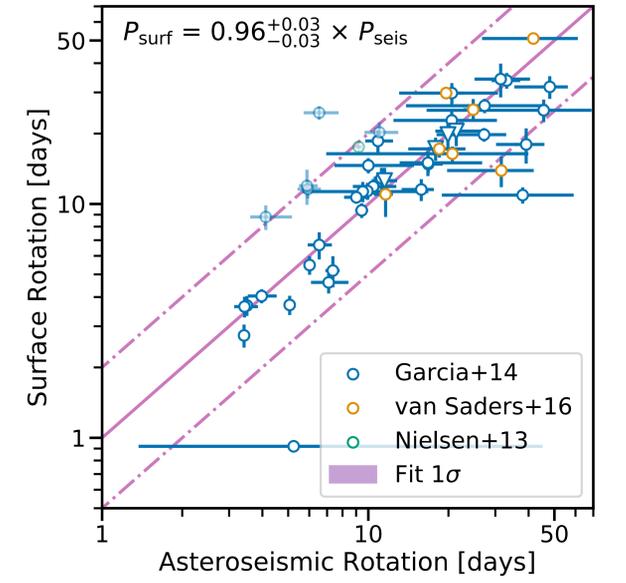
RESULTS

- Our sample **strongly favoured** the model where **weakened magnetic braking takes place**, over one where it doesn't. [Figure 1]
- We also **validated** seismic rotation rates by **comparing** them to **spot rotation** rates, and found they agreed. [Figure 2]

Rotation slows less
on late main sequence
than thought,
seen through vibrations



1



2

ROTATIONAL SPLITTING

- The **rotation** and **inclination** of a star change how asteroseismic modes of oscillation appear.
- The **unique shape** of the modes lets us measure **both** rotation and inclination **simultaneously!**

