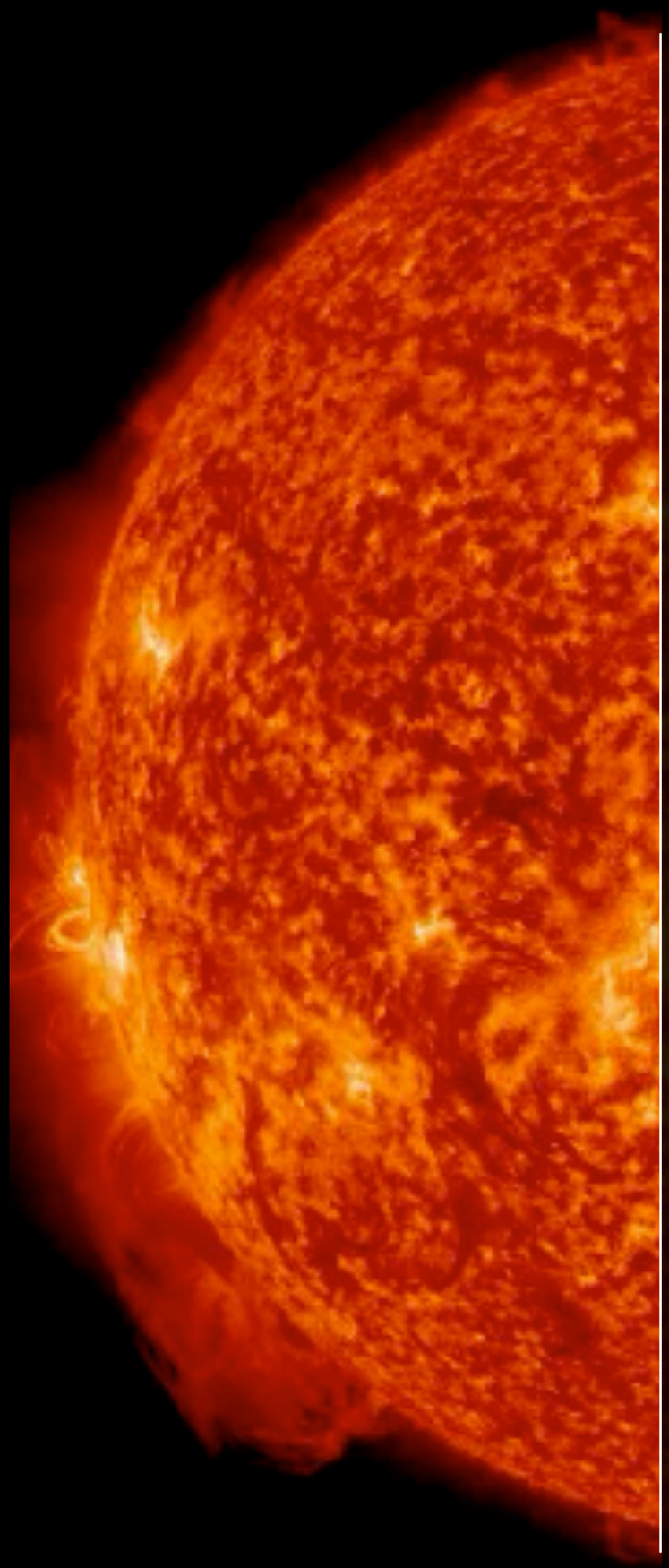


How does stellar metallicity affect the rotation evolution of low-mass stars?

Victor See (he/him)

Lucy Lu, Louis Amard, Julia Roquette

SSW 16, 23-25 January 2024

Winds

Sorry Pluto, planets only

Spots

Planetary interactions
(e.g. aurora)

Atmospheric loss

Coronal emissions
(e.g. X-ray)

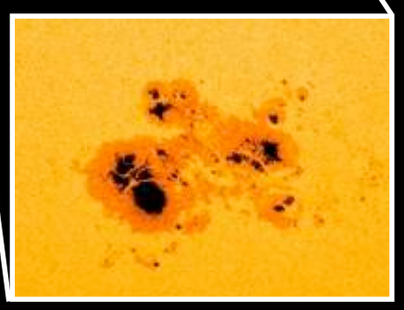
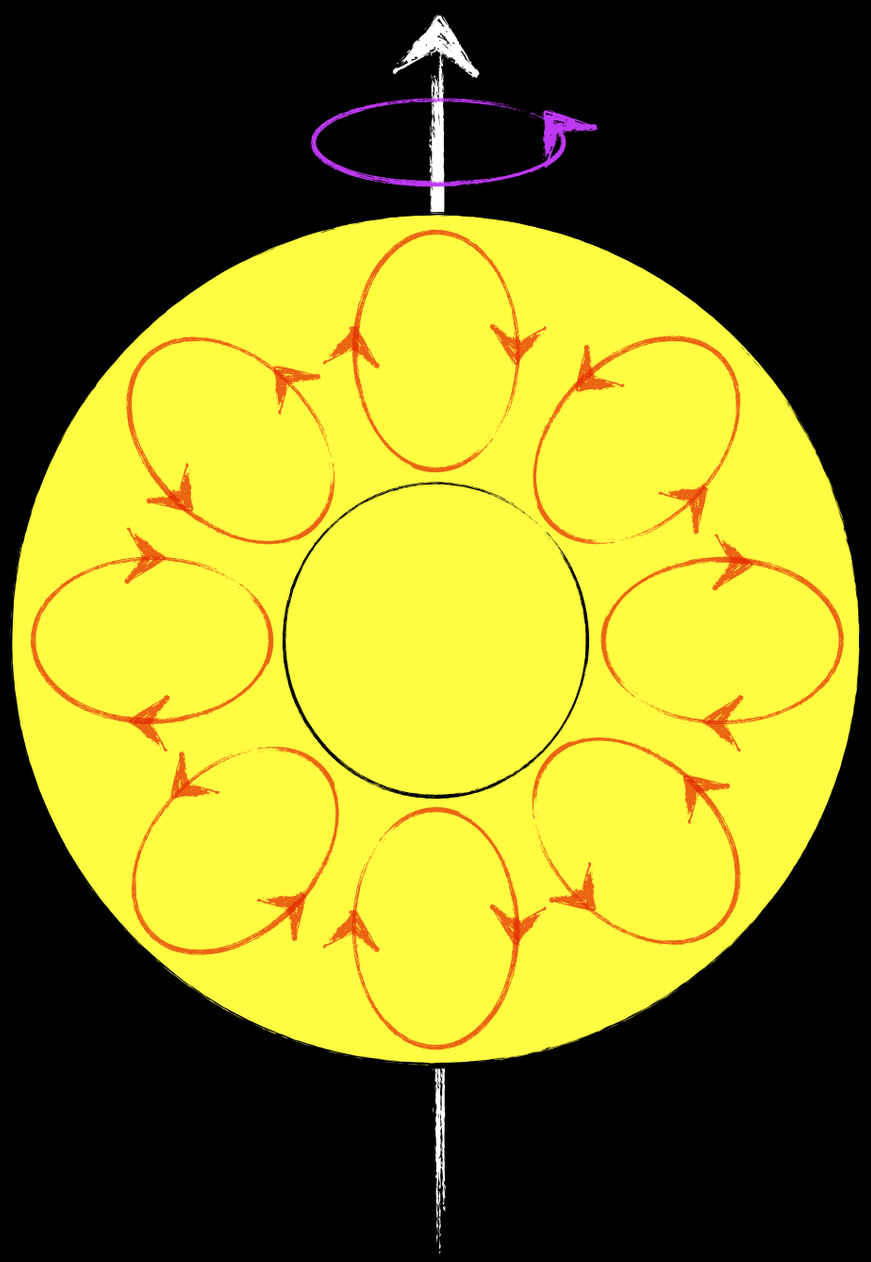


Image credits: NASA



$$\text{Rossby number} = \frac{\text{Rotation period}}{\text{Convective turnover time}}$$

Mostly determined by mass and composition of a star

Magnetic field strength (G)

10^3

10^2

10^1

10^0

10^{-2}

10^{-1}

10^0

Rossby number $= P_{\rm rot}/\tau$

Mass (solar masses)

1.2

1.0

0.8

0.6

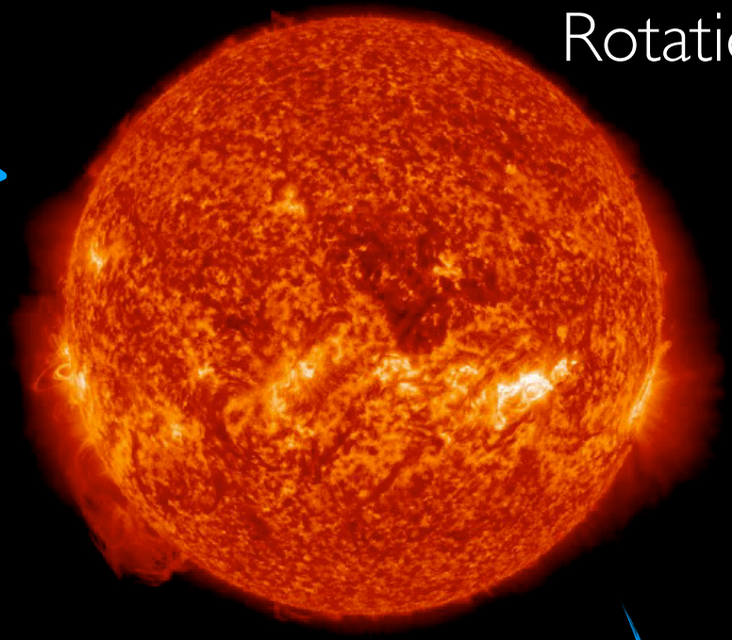
0.4

0.2

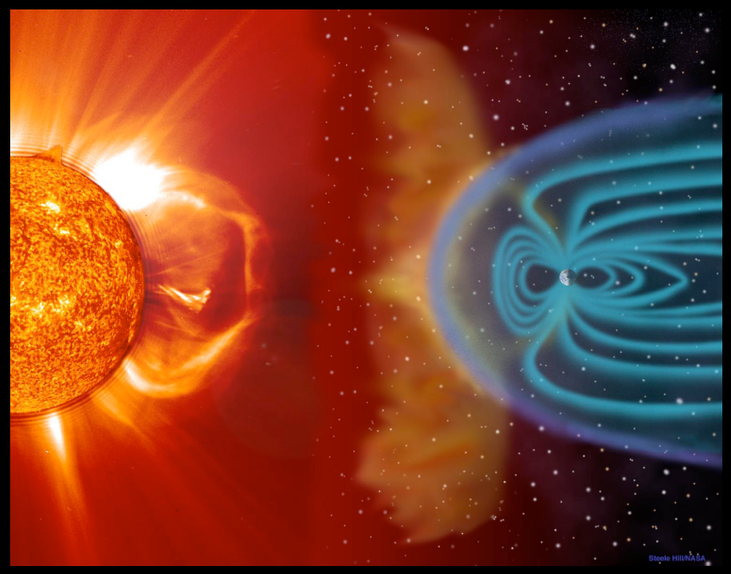
See+19

Rotation period

carry away
angular momentum



Stellar winds



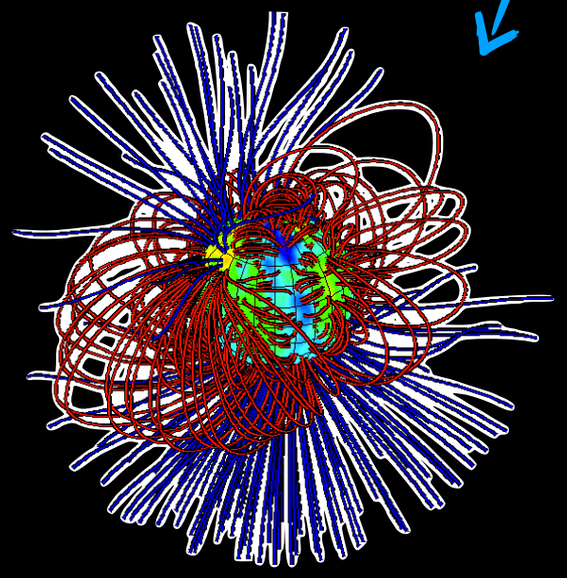
The angular momentum feedback loop

determines
strength of

1	2	>2
H	He	M

Composition

drives



Magnetic field strength

Spectroscopy
LAMOST, APOGEE

Metallicities ([Fe/H])
Luo+15, Liu+20, Du+21, Abdurro'uf+22

Masses
Amard+19

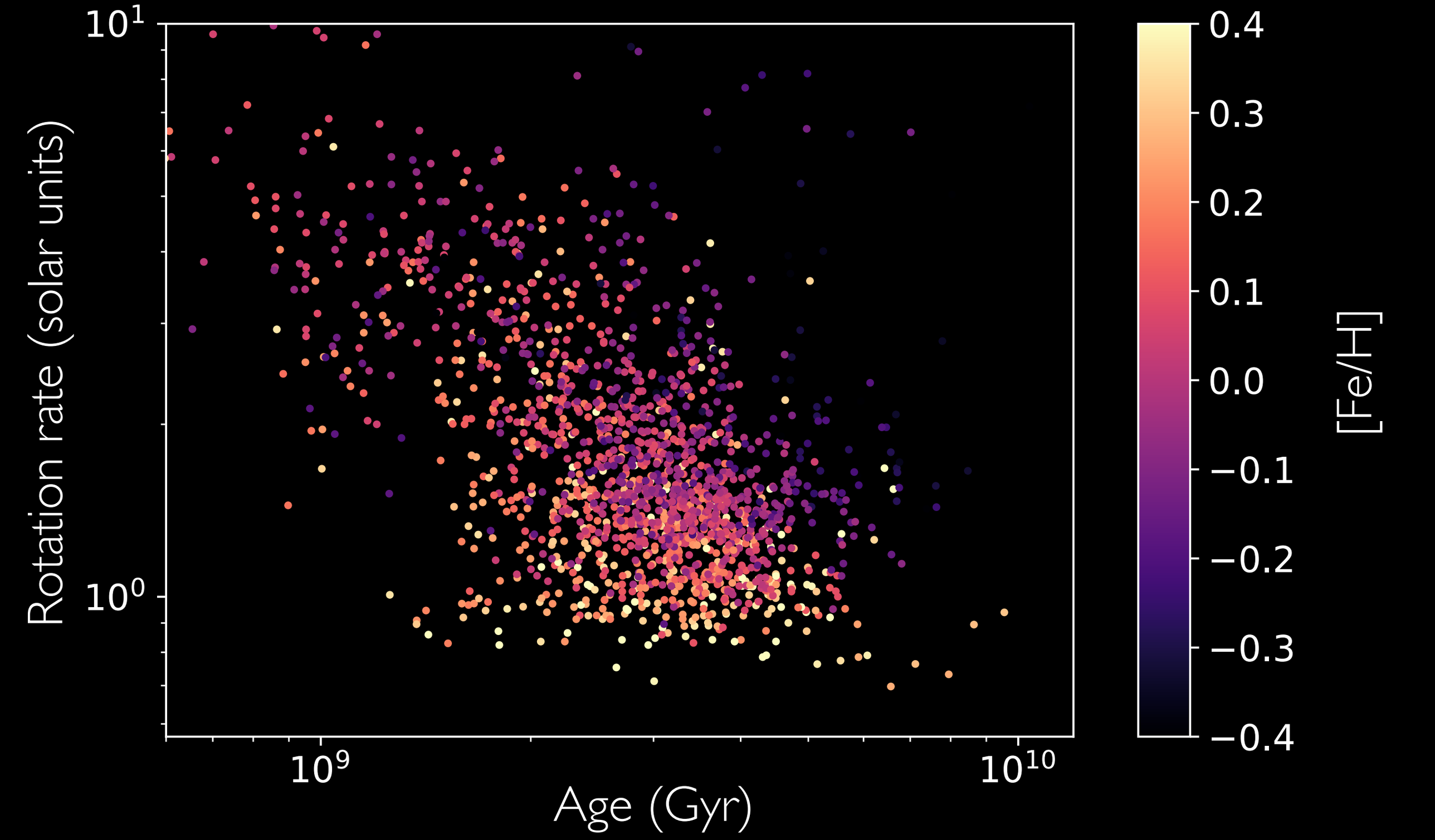
Photometry
Gaia

Ages
Lu+21

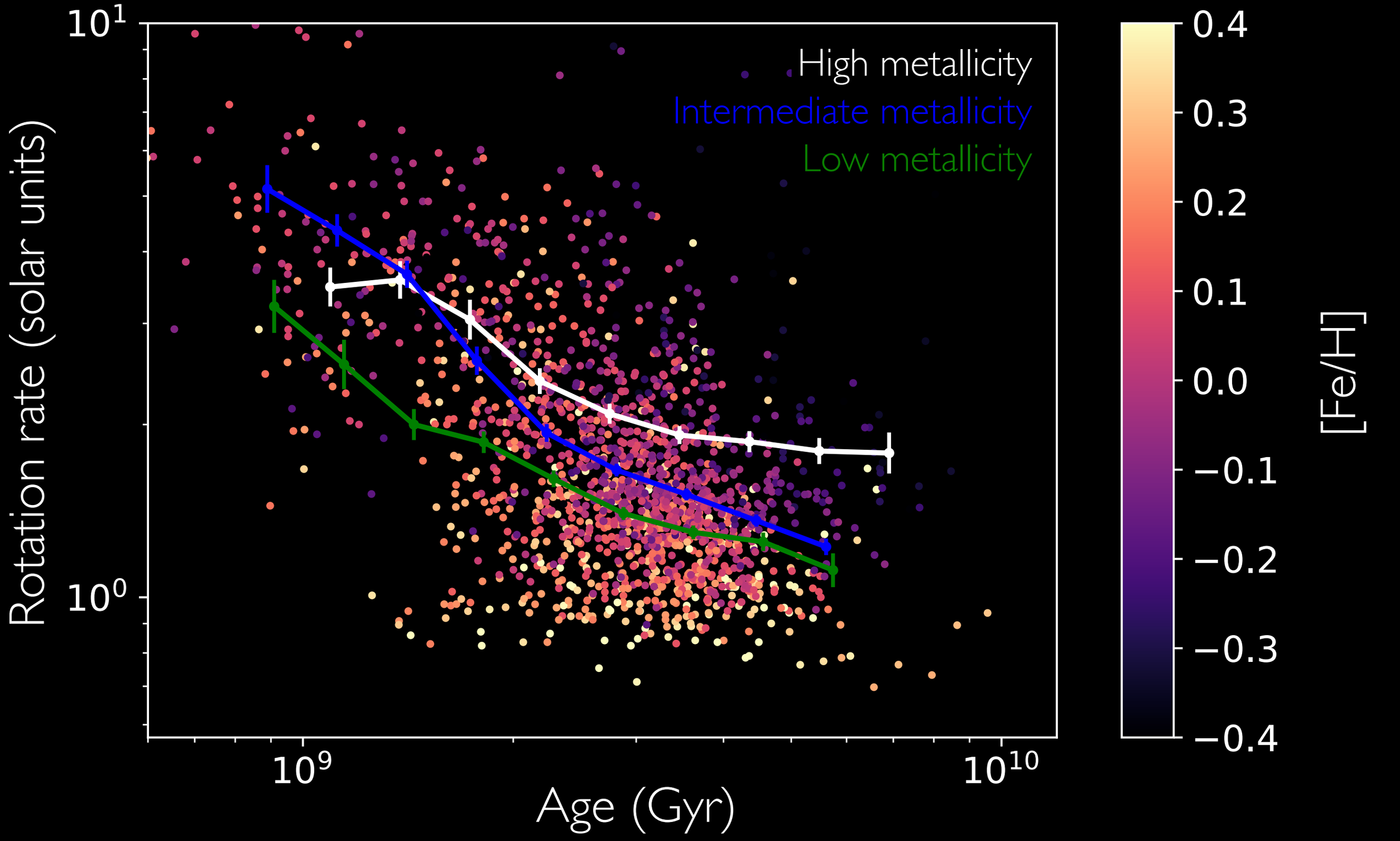
Photometry
Kepler

Rotation periods
McQuillan+14, Santos+19,+21

See+(submitted)



See+(submitted)



See+(submitted)