No UV? What will we lose from stellar astrophysics ???

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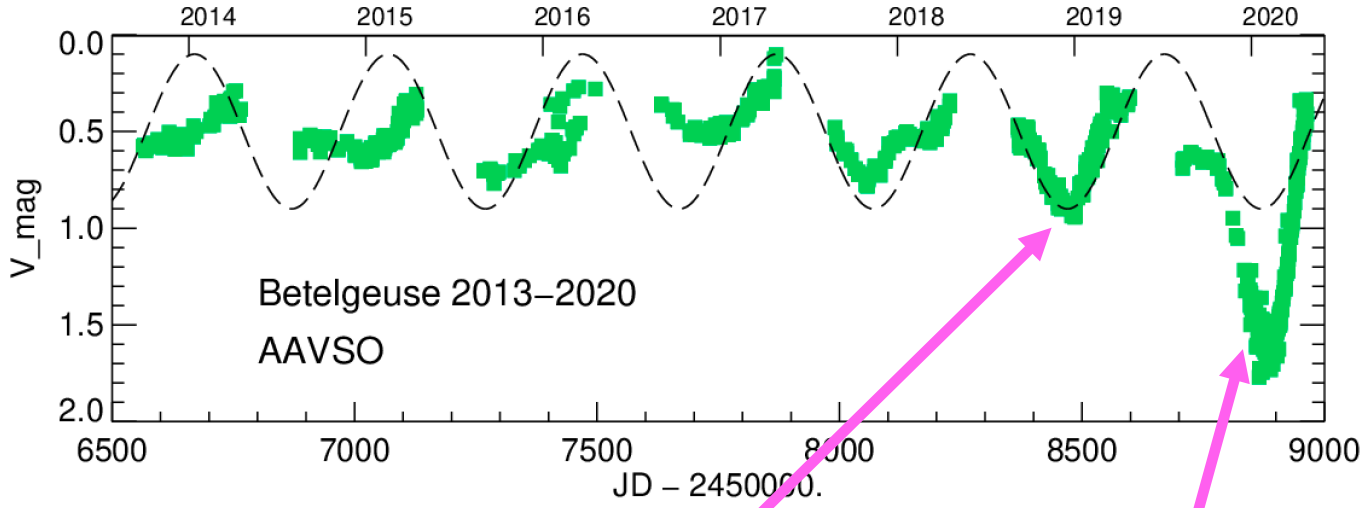
UV direct:

Measures atoms (H I, D I, He I, O I ...),
ions (He II, Mg II, C III, O VI...), molecules (H_2)...,
Spans temperatures from 10^2 – 10^6 K... found
in stars, exoplanets, and the ISM

UV/EUV impacts IR & optical spectra:

UV and EUV radiation affects strength of optical
and IR transitions in stars and
exoplanet atmospheres.

The Mystery of Betelgeuse Dimming:

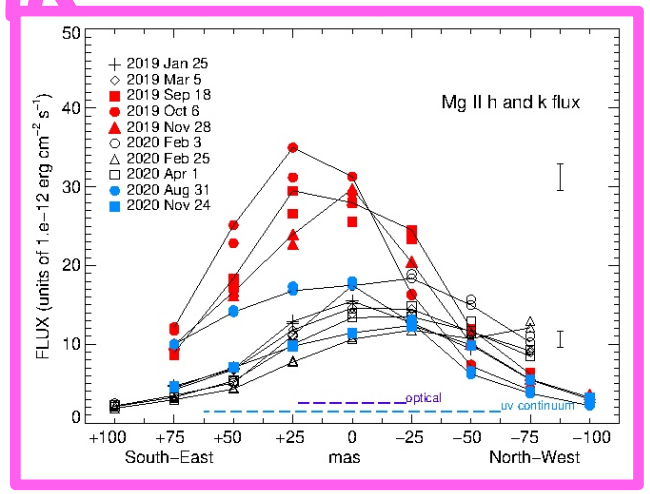


2019 Jan

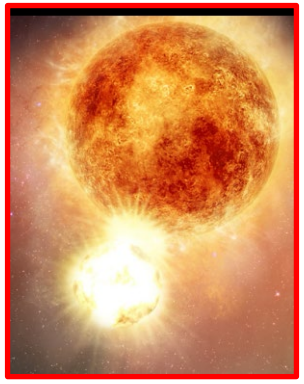
2020 Jan

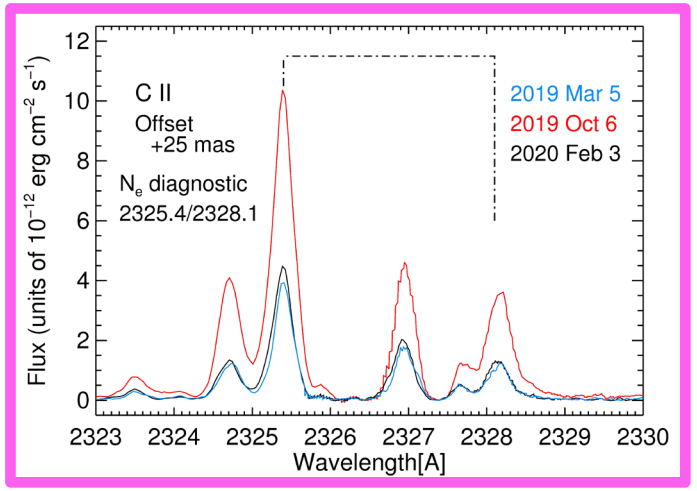
SPHERE/ZIMPOL images:
Montargès, M. + 2020

UV provides the connecting link



Mg II: outflow Southern hemisphere





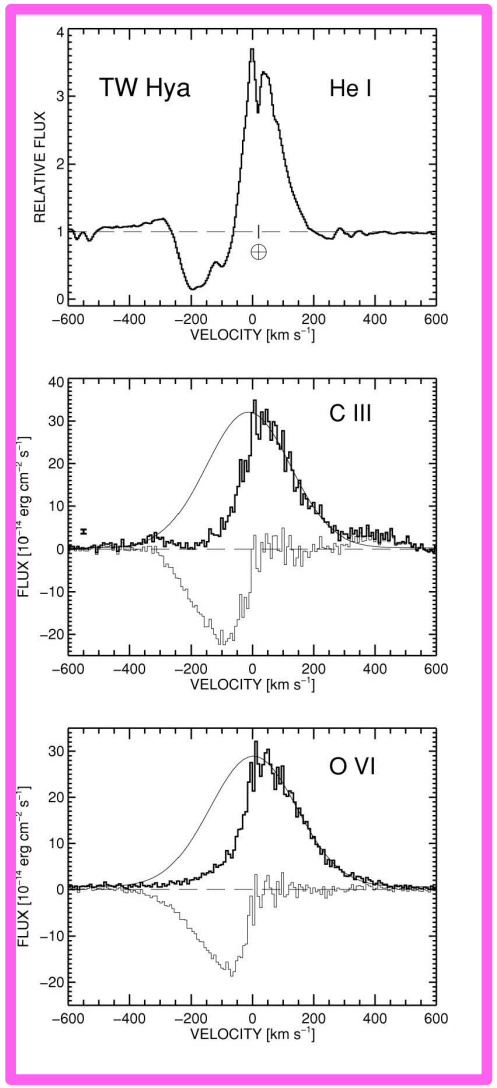
C II: High density outflow

2019 Jan → 2020 Jan

Year of UV

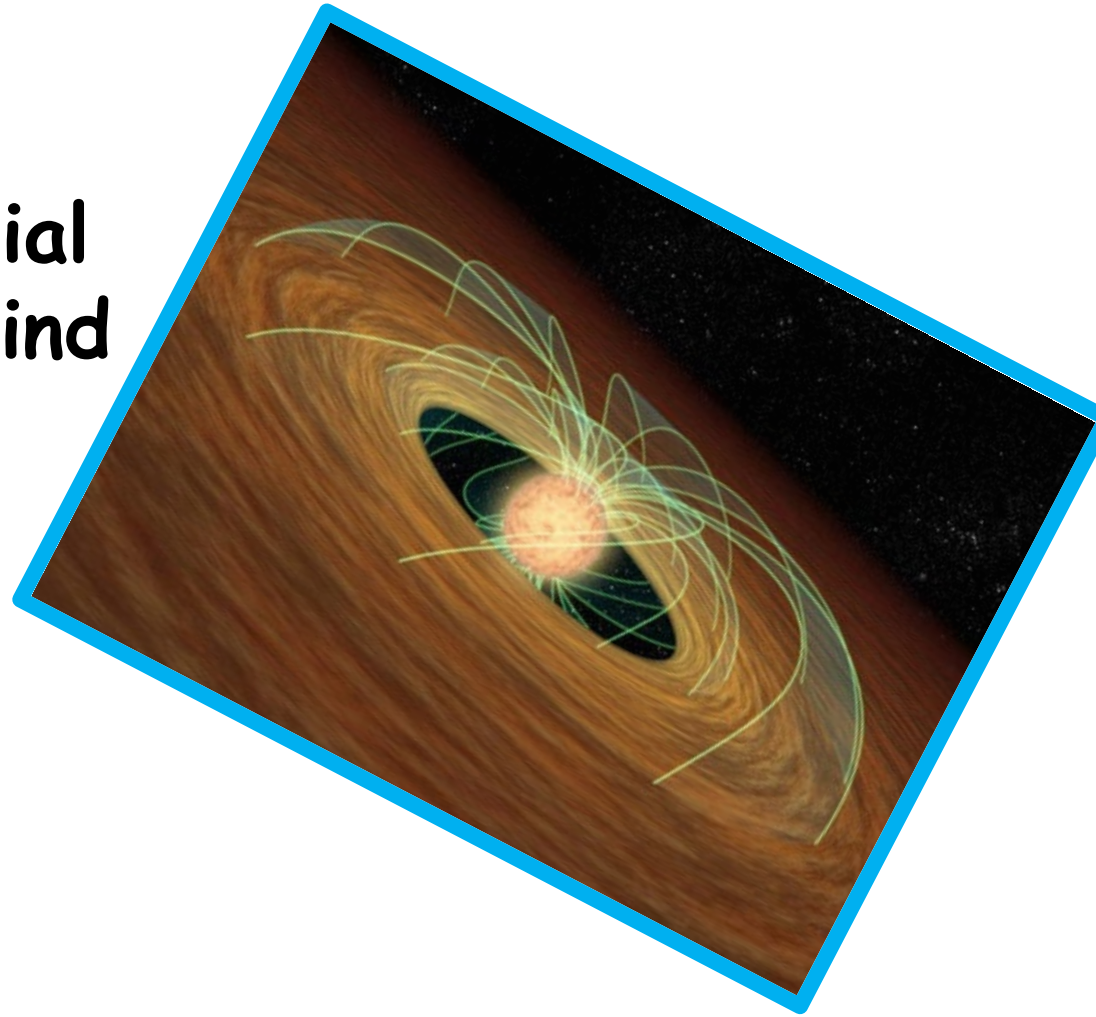
Documents the Surface Mass Ejection

Winds from Young Accreting Stars ….

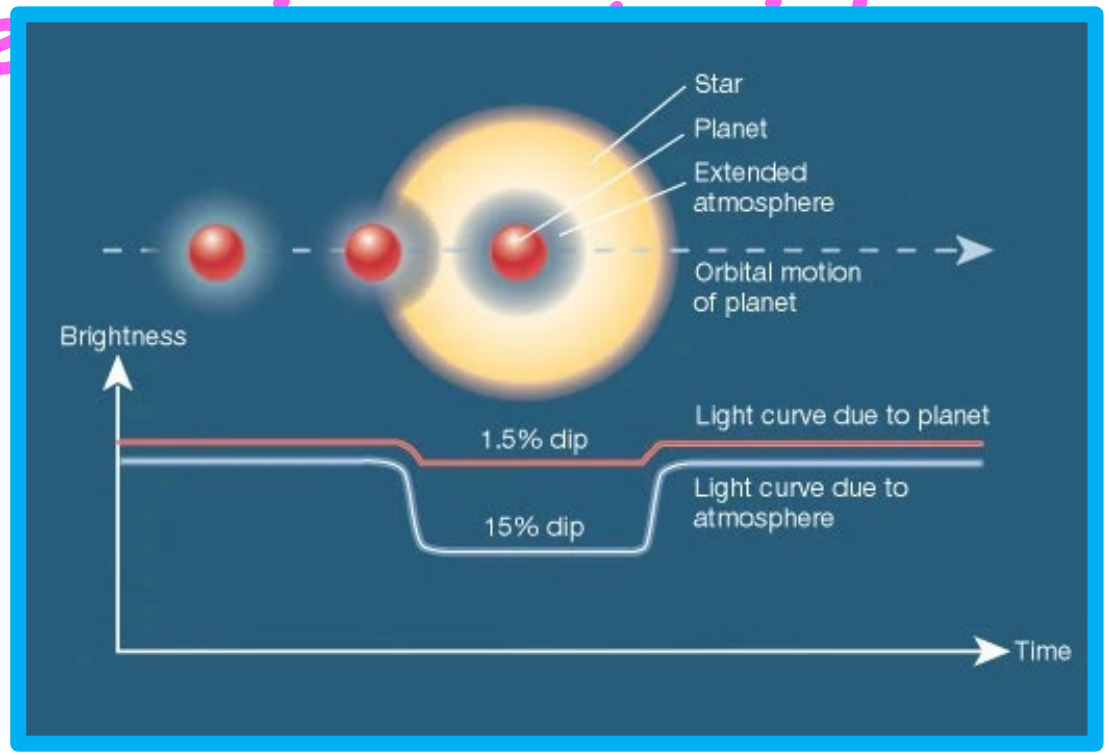


Accreting material drives a hot wind

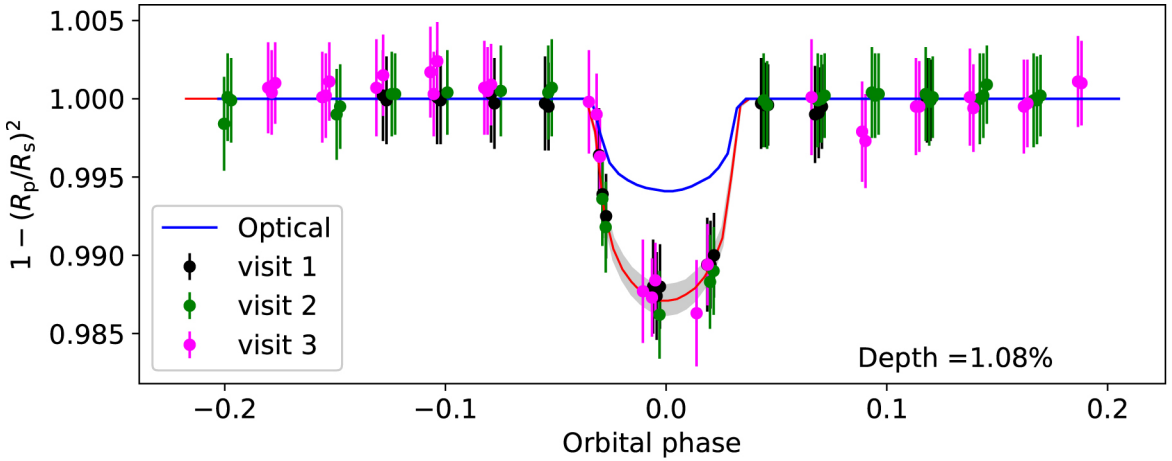
Obvious in many ion species



Exoplanets: Transmission spectroscopy of e



Lyman-alpha: escaping hydrogen HD 209458b (Vidal-Madjar+ 2003)

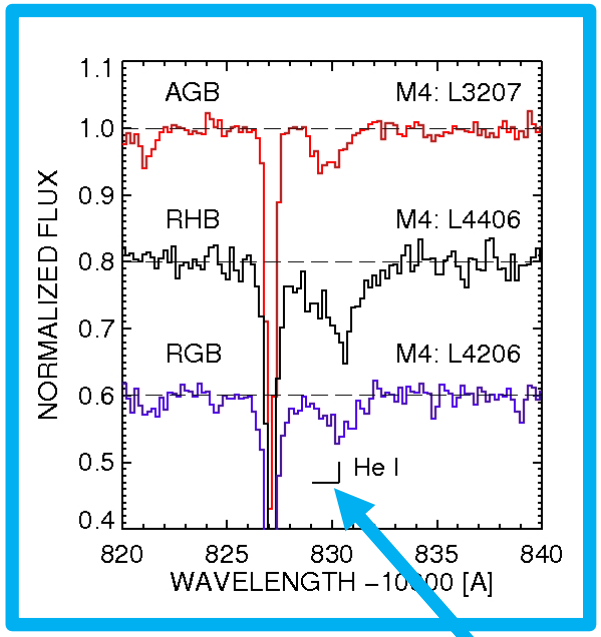


Mg II: Transit of WASP-189B (hot Jupiter) : Near UV broadband (Sreejith+ 2023)

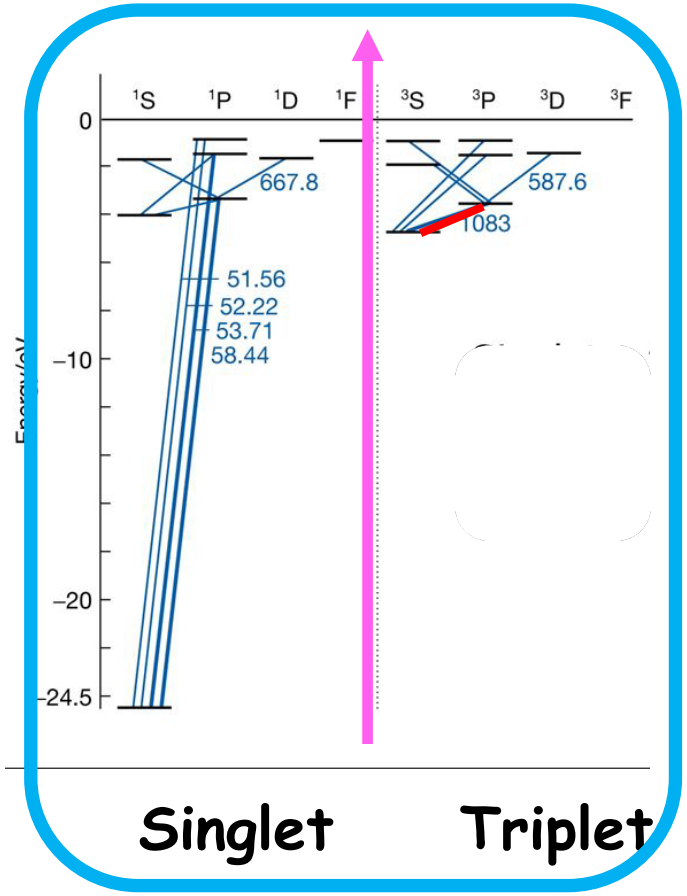
UV Impacts near IR : He I 10830

EUV ionizes helium; recombination populates metastable level

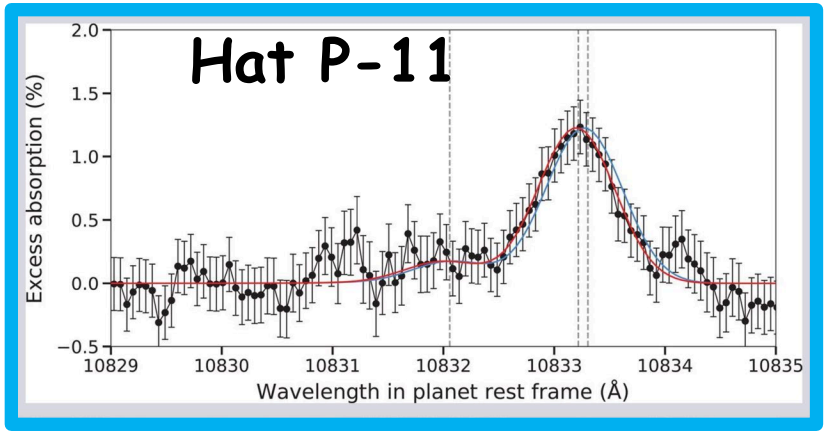
Stellar winds



Fast winds in luminous Stars (and Sun too)



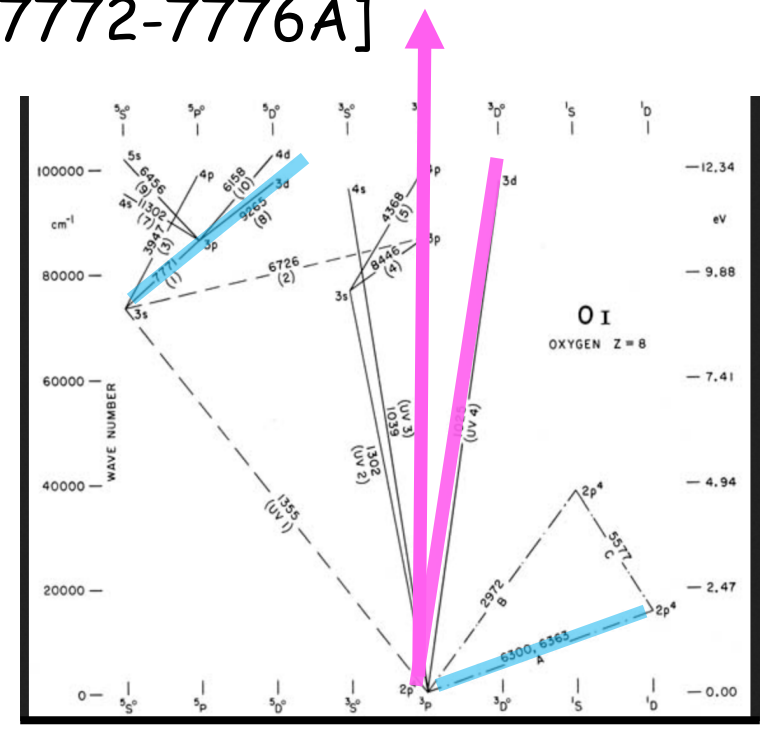
Evaporating He from exoplanet



Transmission spectrum reveals Helium atmosphere … (Allart+ 2018)

UV Impacts Optical Abundances: Oxygen

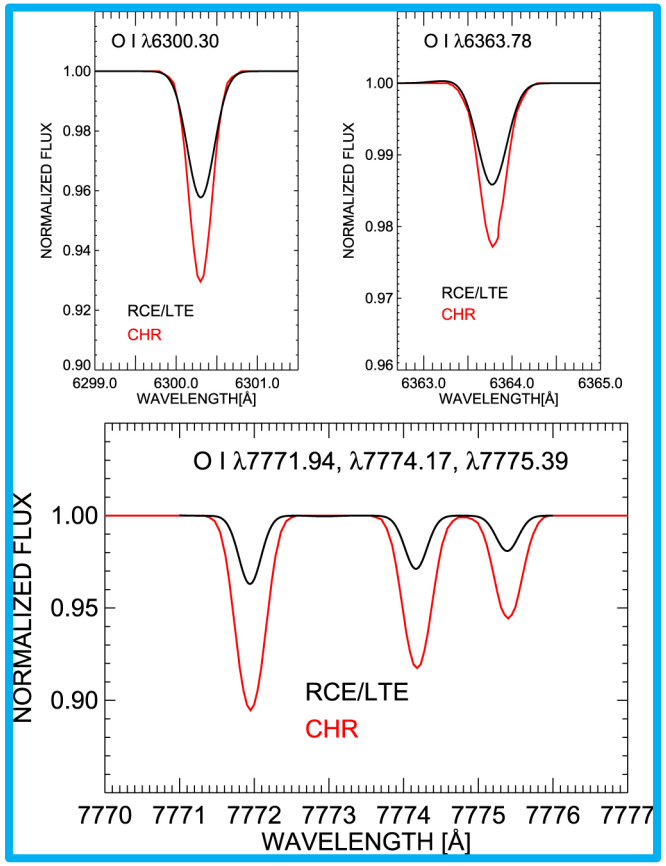
[7772-7776Å]



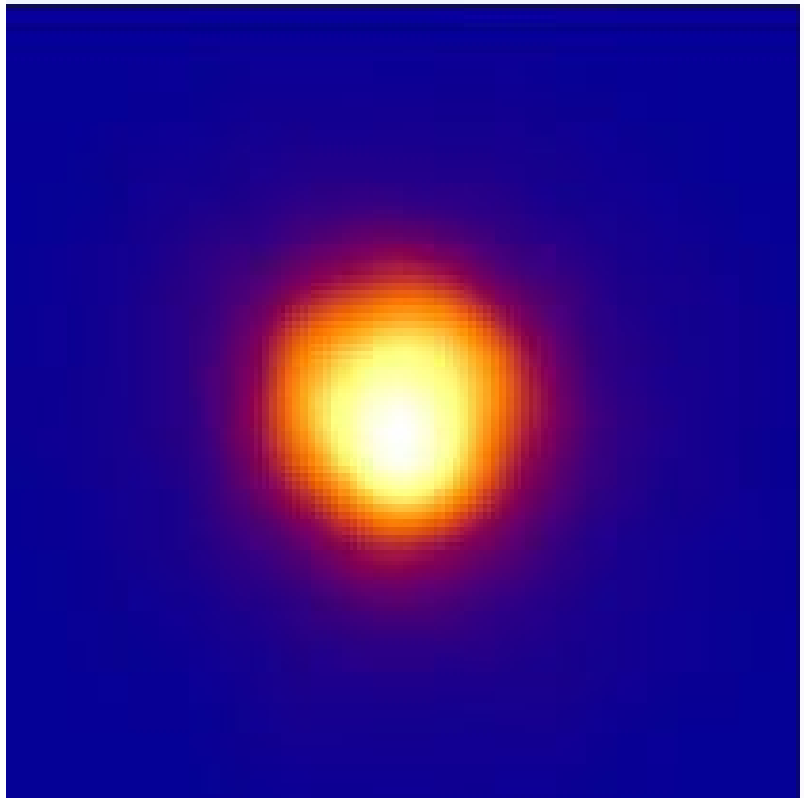
[6300, 6363Å]

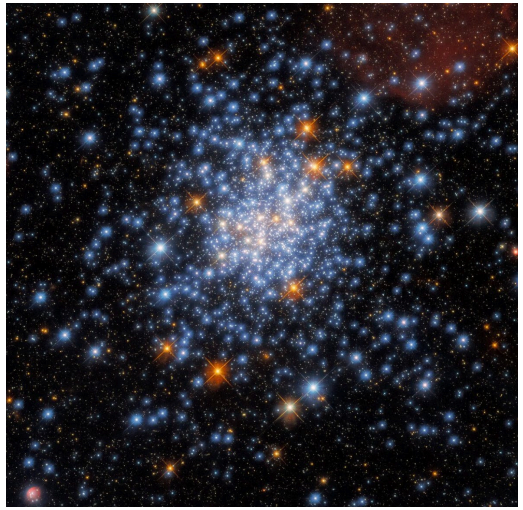
Photoionization (λ < 912 Å)
and photoexcitation by Lyman-β (1025Å) strengthens the Oxygen lines.

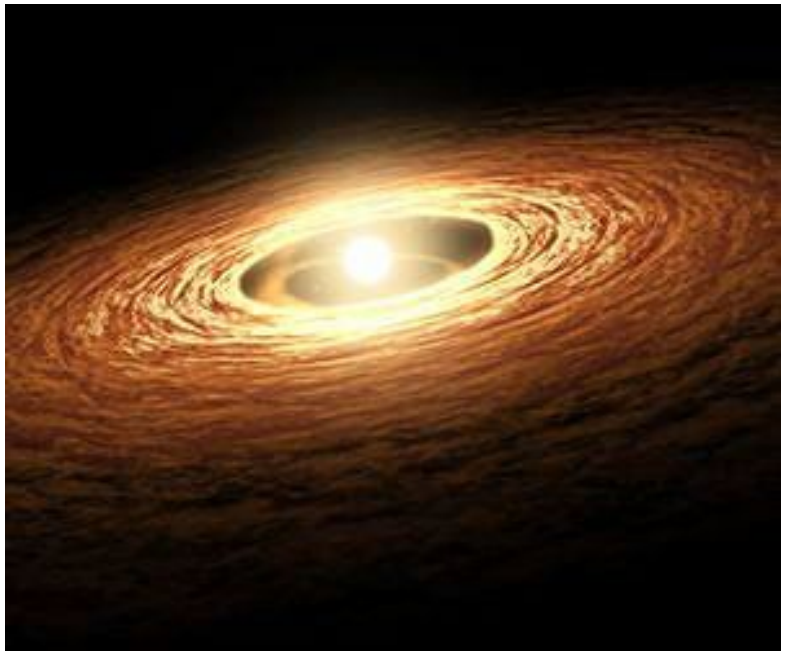
Oxygen abundances can *decrease* by a factor of ~3

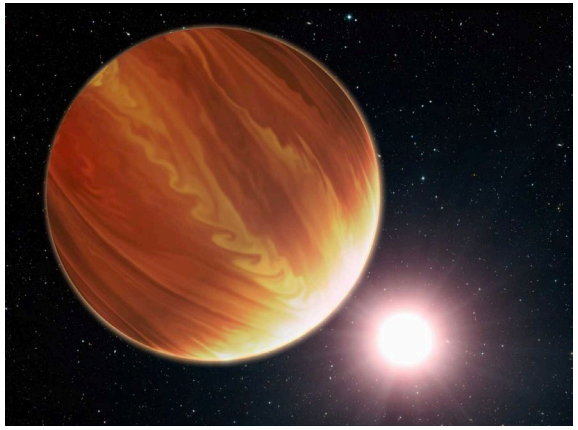


Giant stars in Omega Centauri (Dupree+ 2016)









No gap!!