

Stellar Chromospheres

ASTR691
W10L2

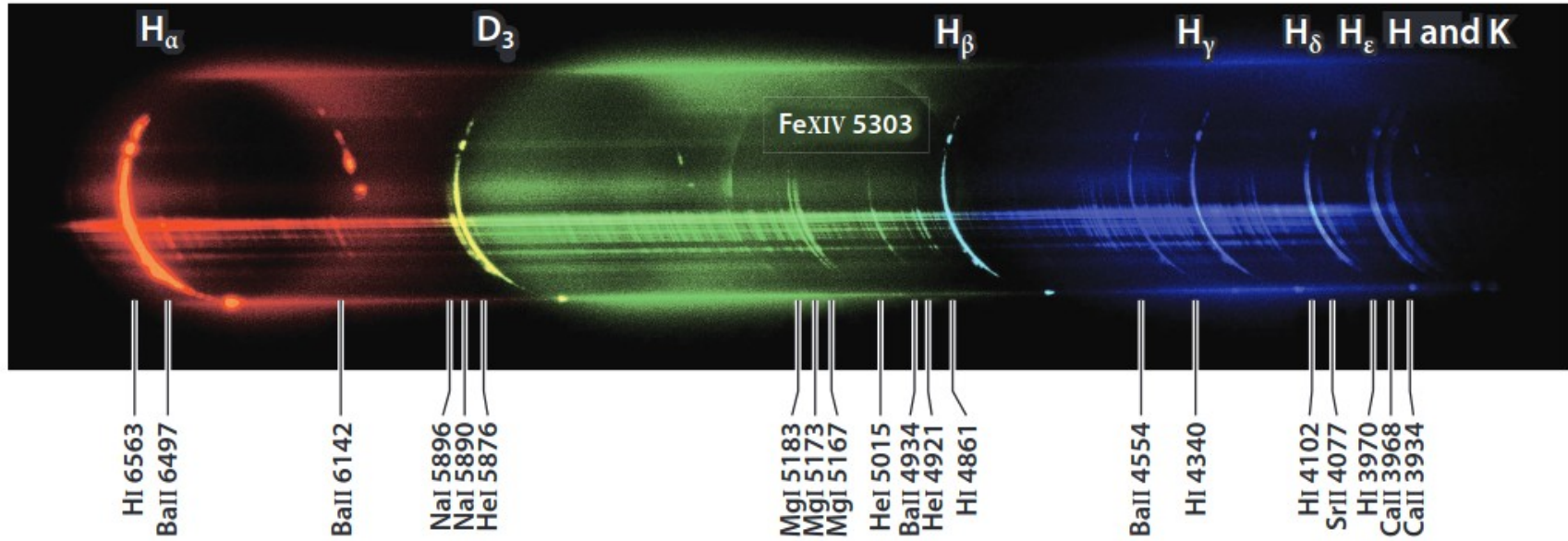


Figure 2

A spectral image of the Sun observed at the beginning of a total eclipse showing chromospheric emission lines of hydrogen ($H\alpha$, $H\beta$, etc.), the HeI D_3 line, and the CaII H and K lines. The FeXIV line is formed in the solar corona. This flash spectrum was taken by Manfred Rudolf and the EurAstro team (Rutten 2010). Figure courtesy of Kevin Reardon.

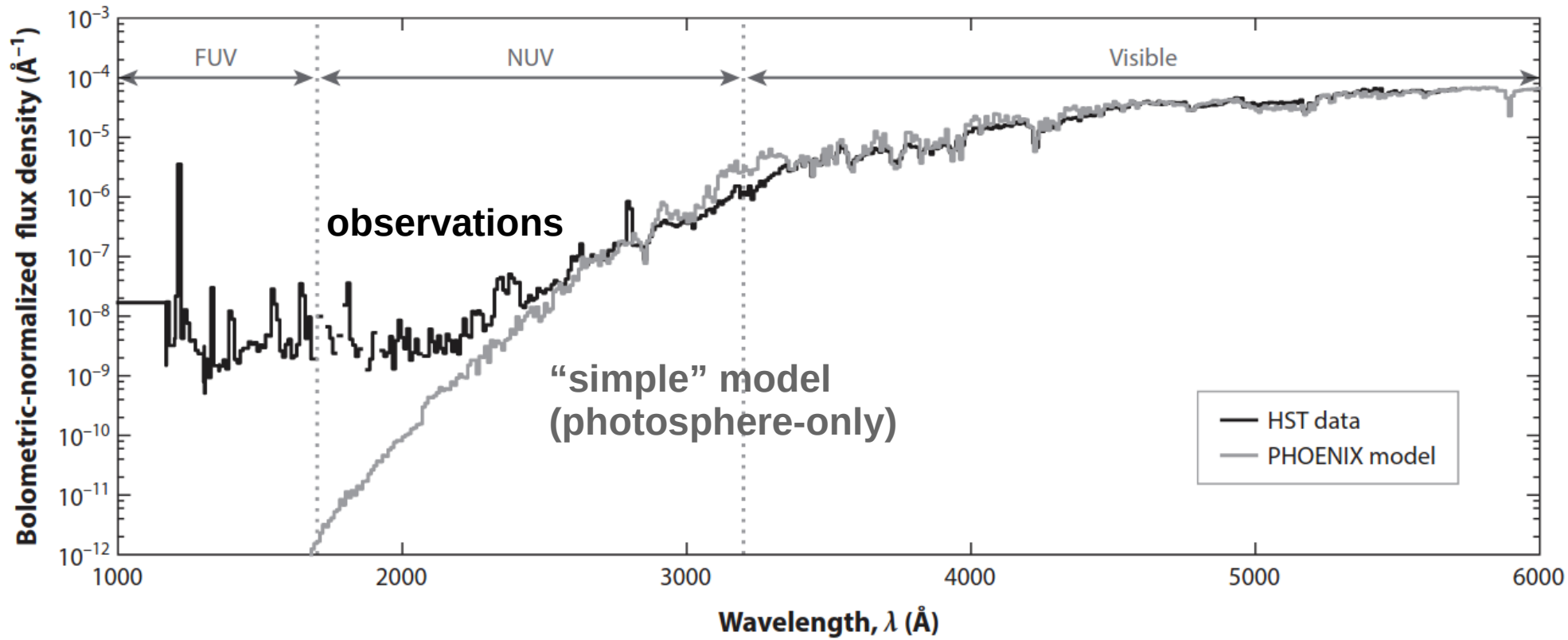
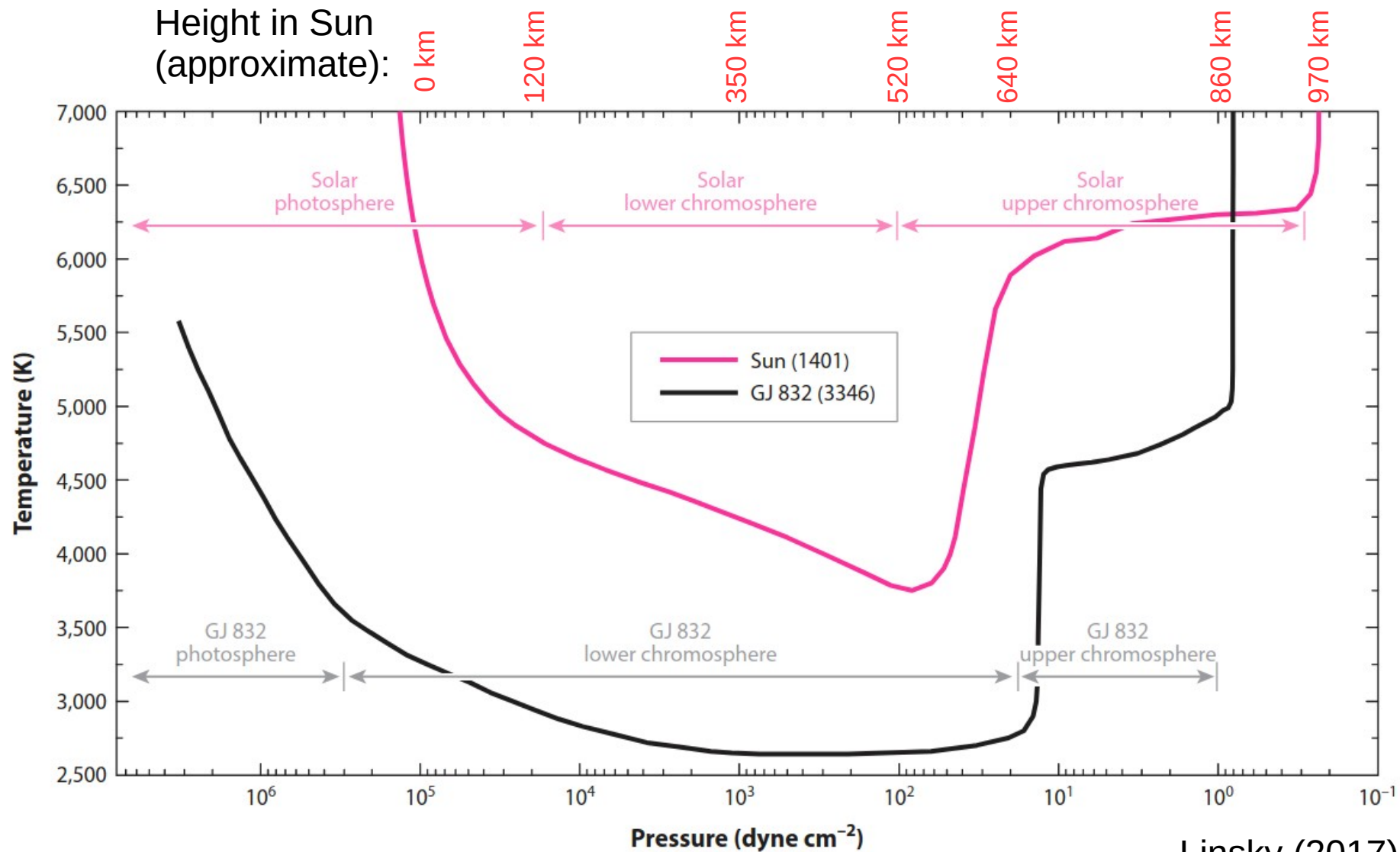


Figure 4

Comparison of the PHOENIX model spectrum of the photosphere of a star with the effective temperature of GJ 832 ($M1.5 V$) with the observed COS spectrum of this star showing the **severe underestimate of the observed flux below 250 nm obtained by not including a **chromosphere****. Adapted from Loyd et al. (2016) with permission. Abbreviations: COS, Cosmic Origins Spectrograph (on HST); FUV, far-ultraviolet; HST, *Hubble Space Telescope*; NUV, near-ultraviolet.



Linsky (2017)

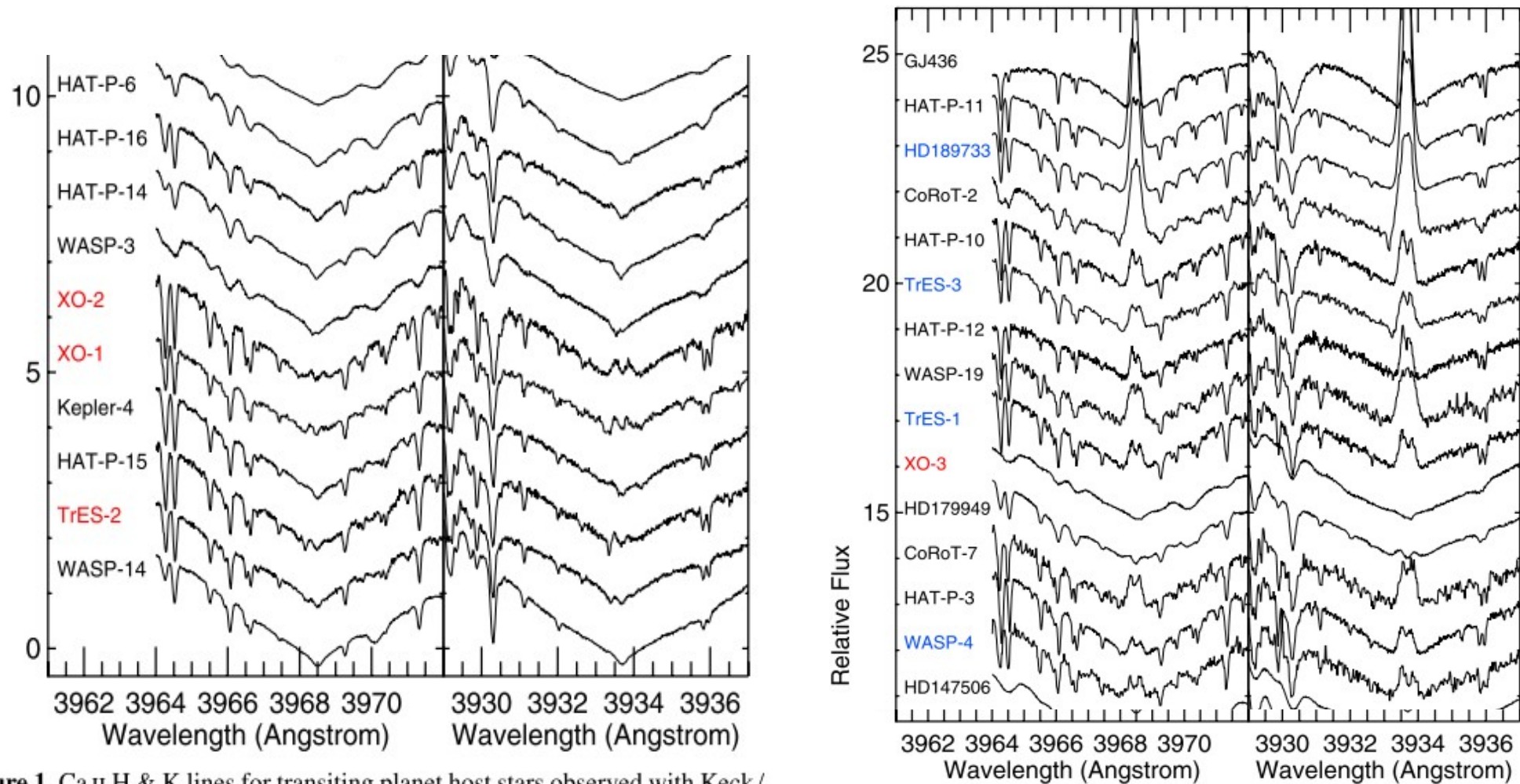
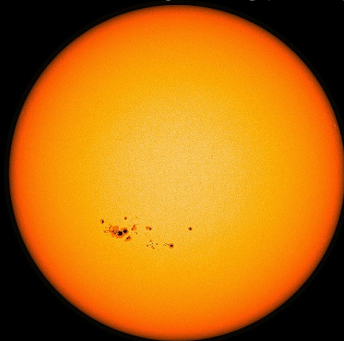
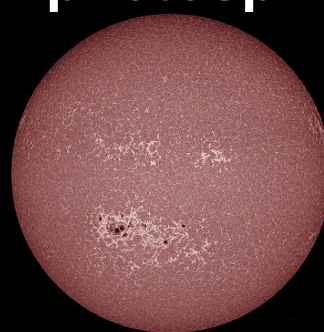


Figure 1. Ca II H & K lines for transiting planet host stars observed with Keck/

Limb Darkening (in photosphere) – $dT/d\tau > 0$



HMI Continuum
Matches visible light
Photosphere

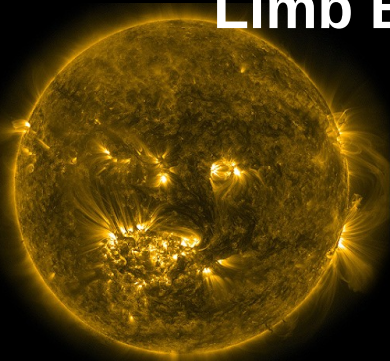


AIA 1700 Å
4500 Kelvin
Photosphere

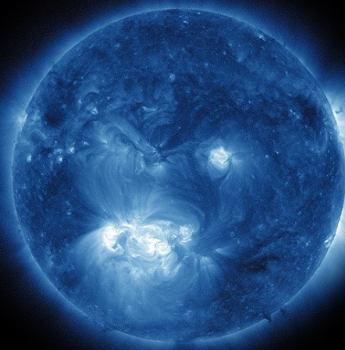


AIA 4500 Å
6000 Kelvin
Photosphere

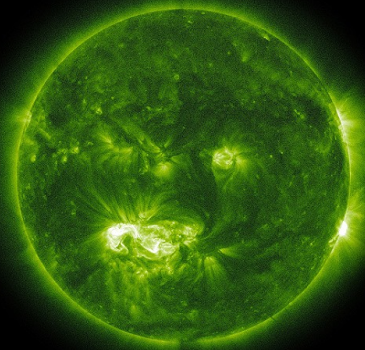
Limb Brightening (in upper chromosphere & corona) – $dT/d\tau < 0$



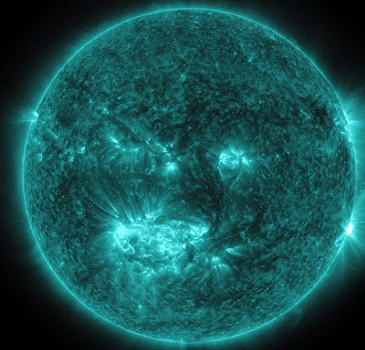
AIA 171 Å
600,000 Kelvin
Upper transition
Region/quiet corona



AIA 335 Å
2.5 million Kelvin
Active regions



AIA 094 Å
6 million Kelvin
Flaring regions



AIA 131 Å
10 million Kelvin
Flaring regions