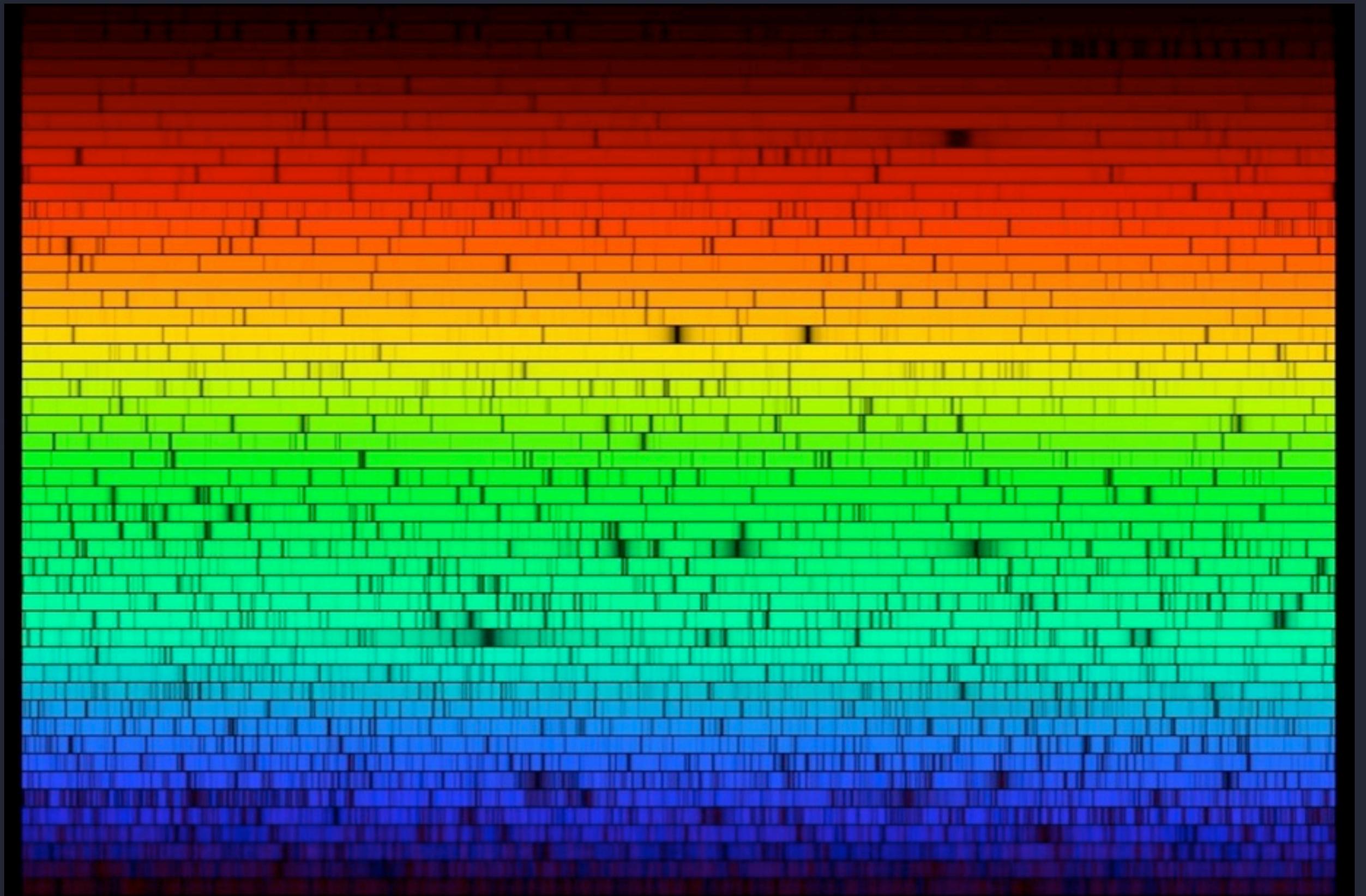


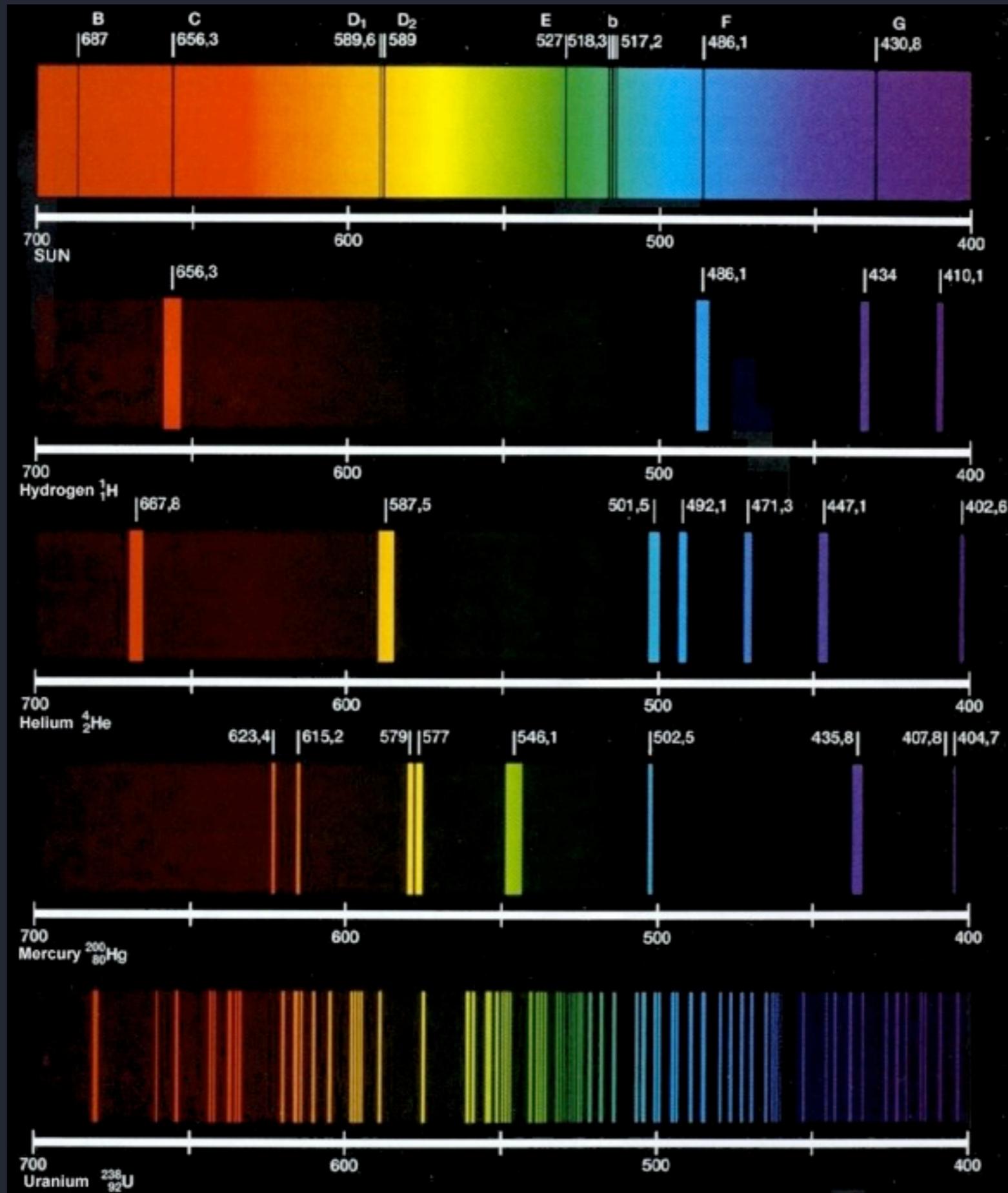
# Astro I: Introductory Astronomy



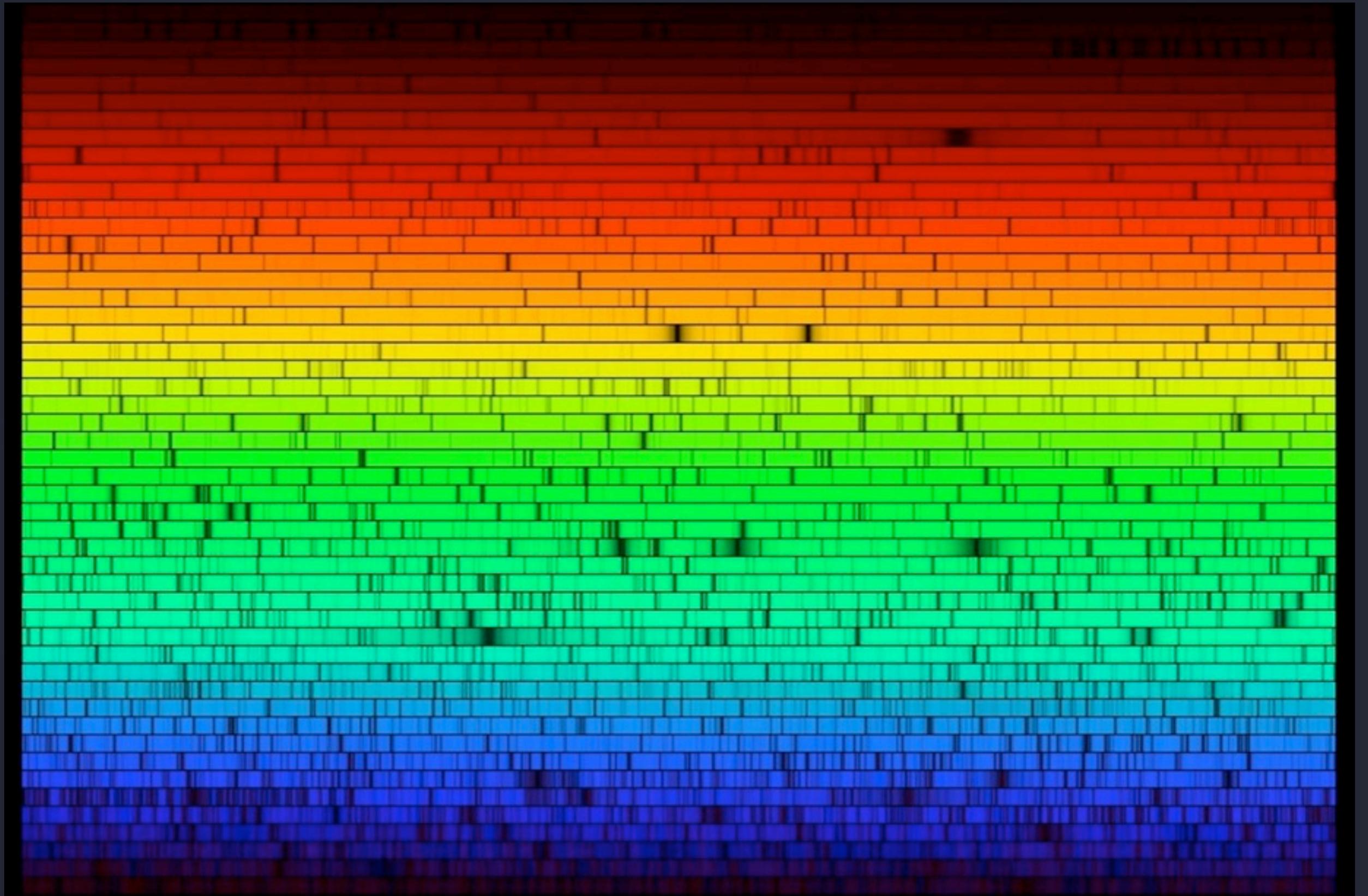
Stars of different colors and brightnesses (yes, they're not all at the same distance, but many (and all the bright ones) are at roughly the same distance in the case of Orion



# examples of spectra

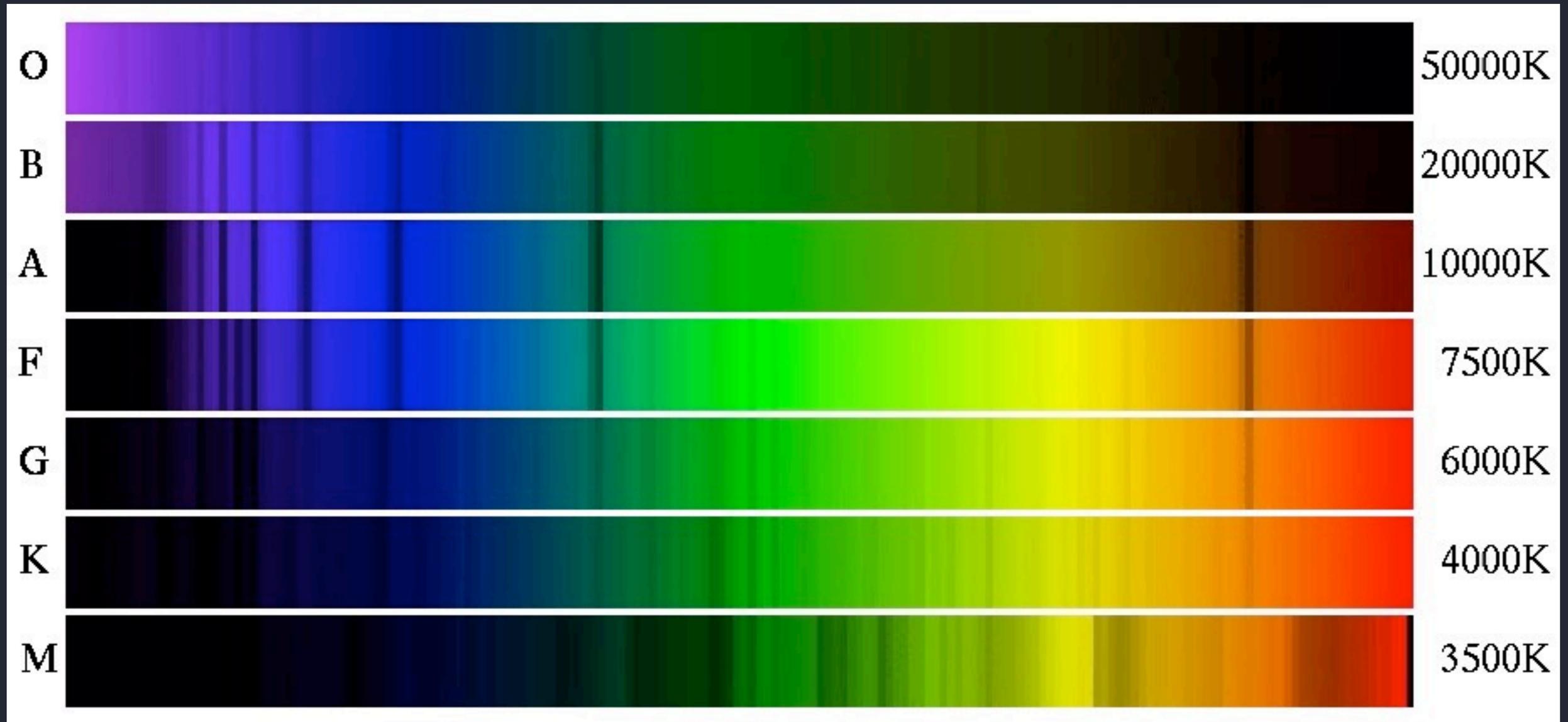


The Sun's spectrum: see the absorption lines?



# Spectra of seven different stars: ordered by temperature

note the thermal emission trend (bluer when hotter, redder when cooler)



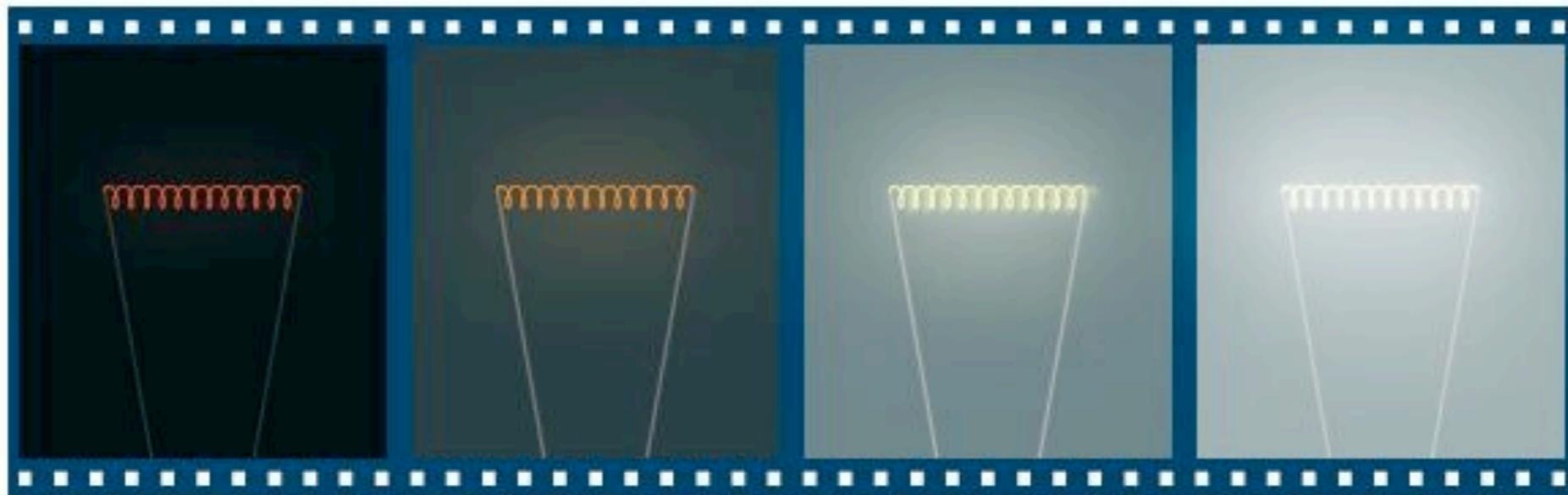
Recall: thermal emission (this is a nice review of the two main properties)

## Stars Glow by *Thermal Emission* of Light

Stars emit light according to the Planck Function (blackbody).

$$\lambda T = 0.00290 \text{ m-K}$$

$$\text{Flux at Surface} = \sigma T^4$$



Cool  
Red & Faint

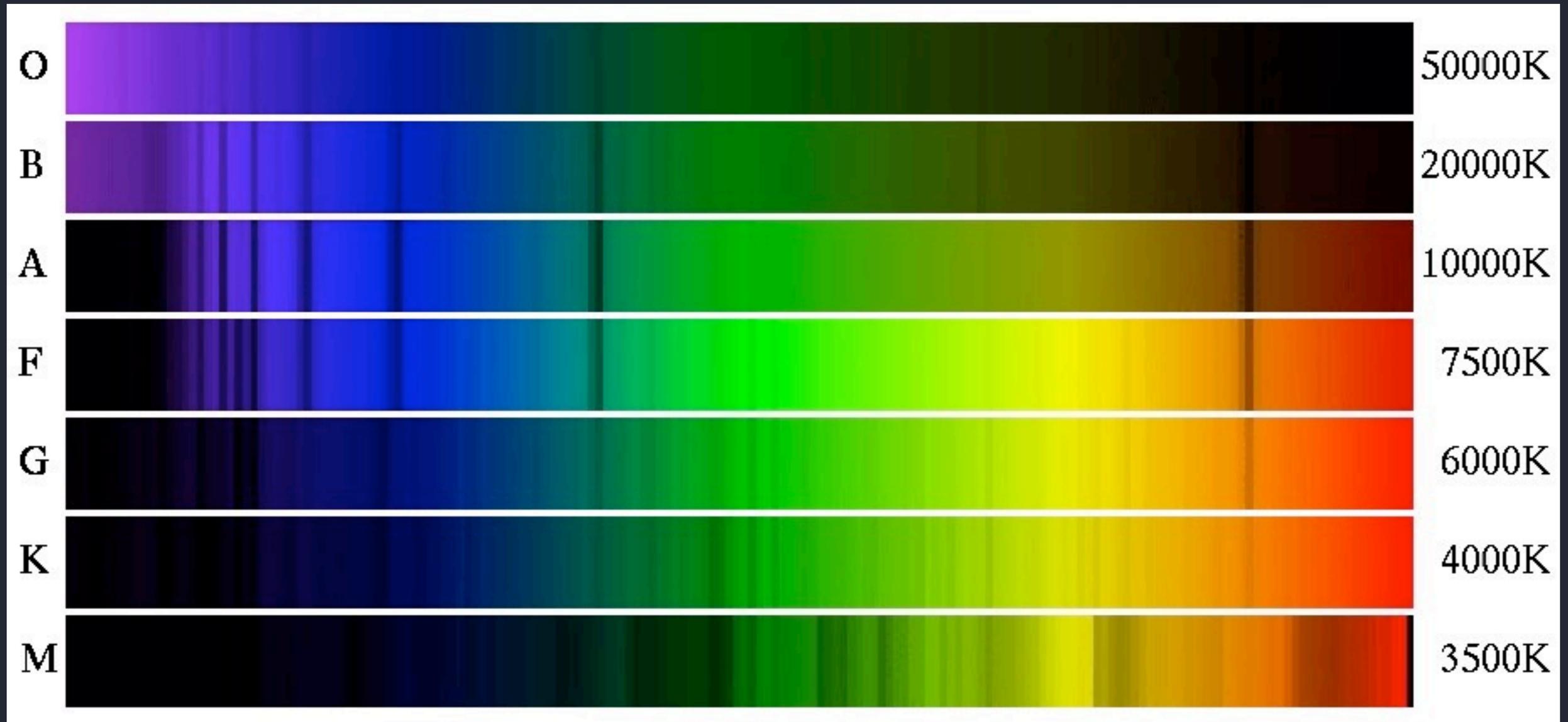
Warmer

Hot

Hotter  
White & Bright

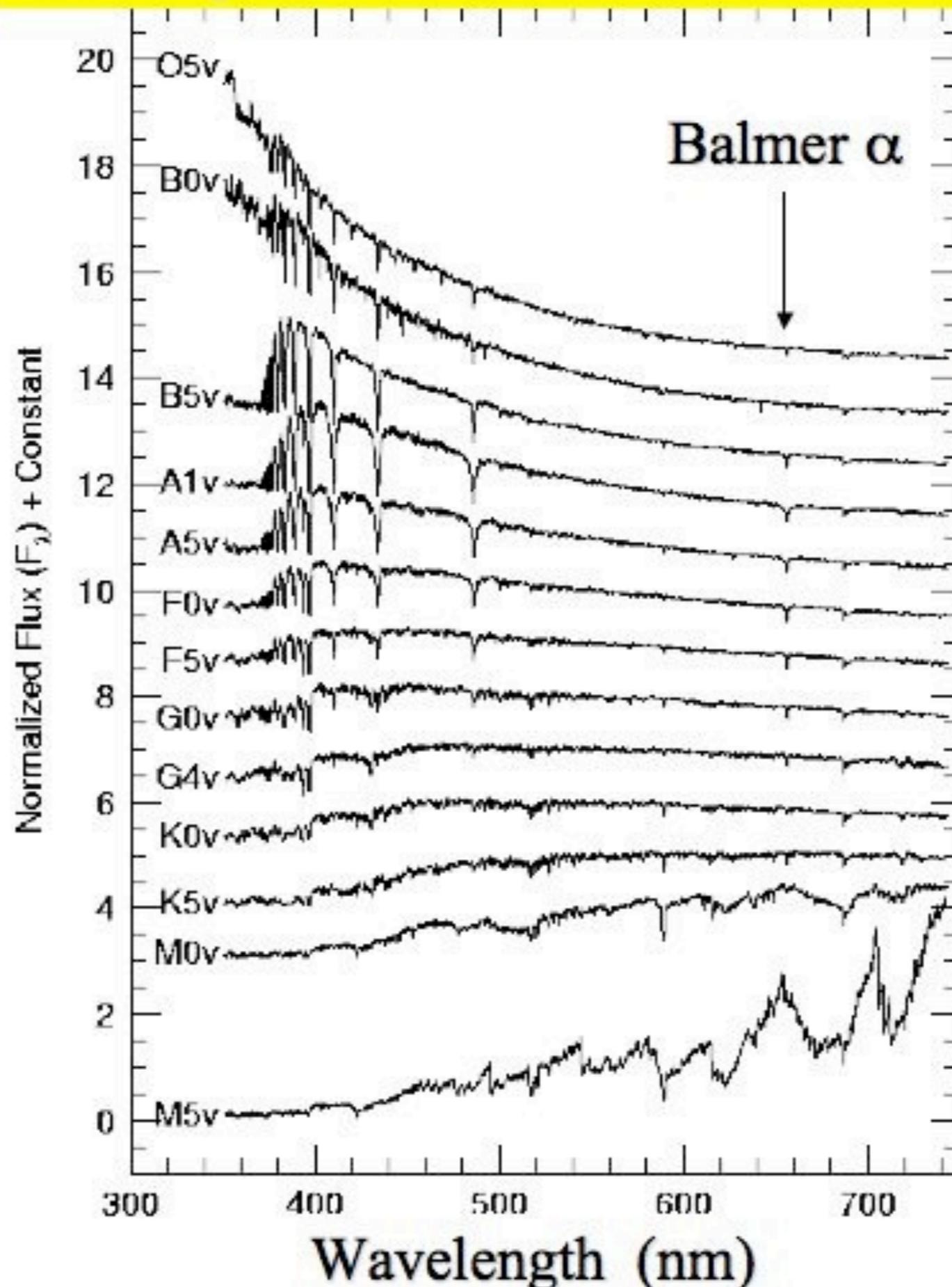
# Spectra of seven different stars: ordered by temperature

also, note the absorption lines and their patterns



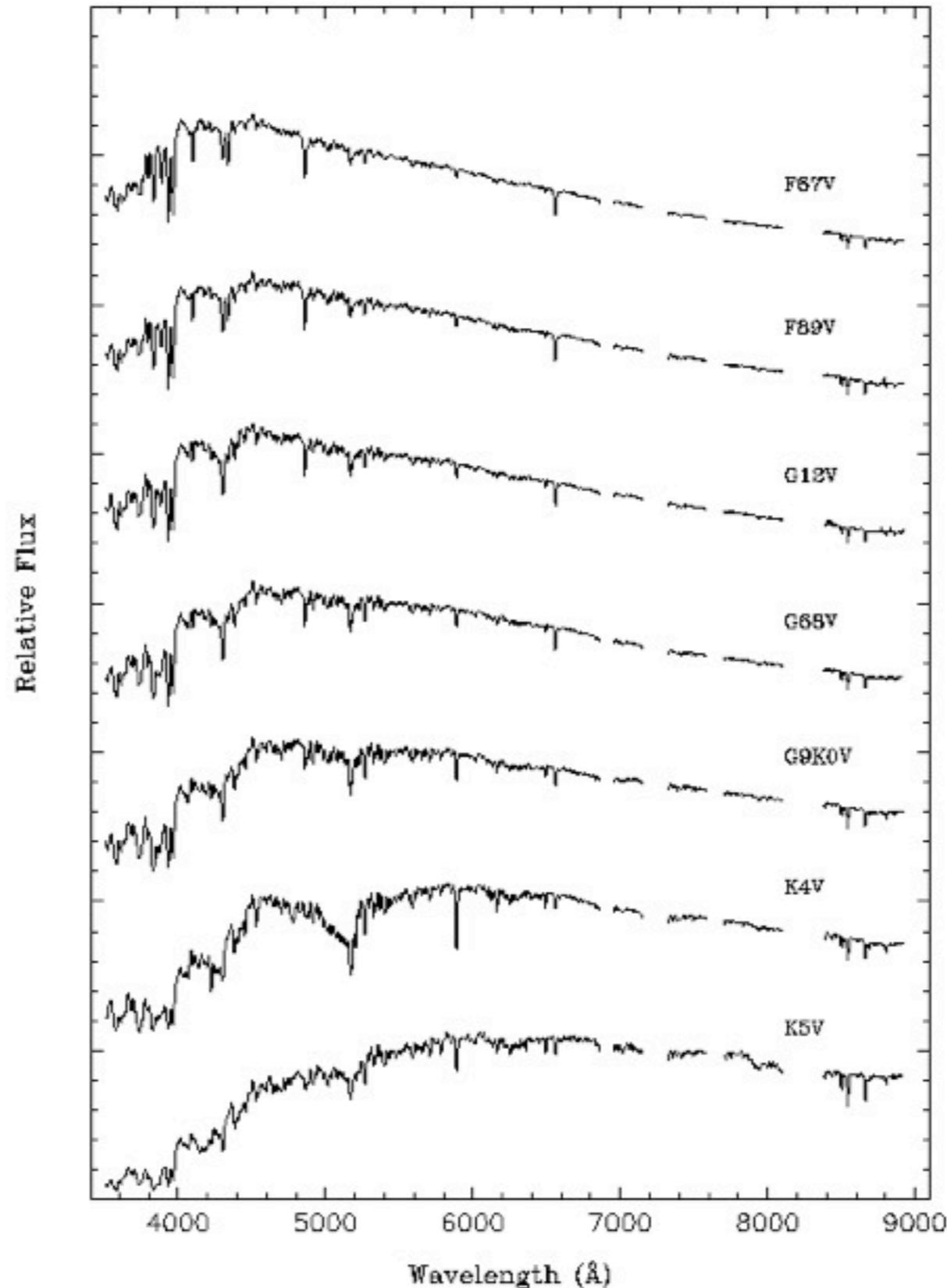
# Stellar Spectra: Hottest to Coolest

Flux



Hot Surf:  
 $T=50,000\text{K}$

Cool Surf:  
 $T=2,500\text{K}$



The temperature range is only a few thousand degrees here:  
note that the overall thermal shape doesn't shift that much (except for the star at the bottom, the coolest one)

# Globular cluster M15: what can we learn from the star colors?

