ASTR 1040 RECITATION 7

10/17/2023

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HOUSEKEEPING

a) Midterm grades are finalized – make sure everything looks right! If you're confused / think I did math wrong please come and chat / send me an email.

b) Observing report due today if you came last week – do the alternate assignment before end of semester if you couldn't make either observatory night

c) Homework 5 due Thursday – will try to save last ~15 minutes of class for questions / brainstorming!

d) Will not be in my office as much for the next ~ month as I help my tiny dog recover from a back injury...so email if you need to meet outside of recitation / class / AHR.

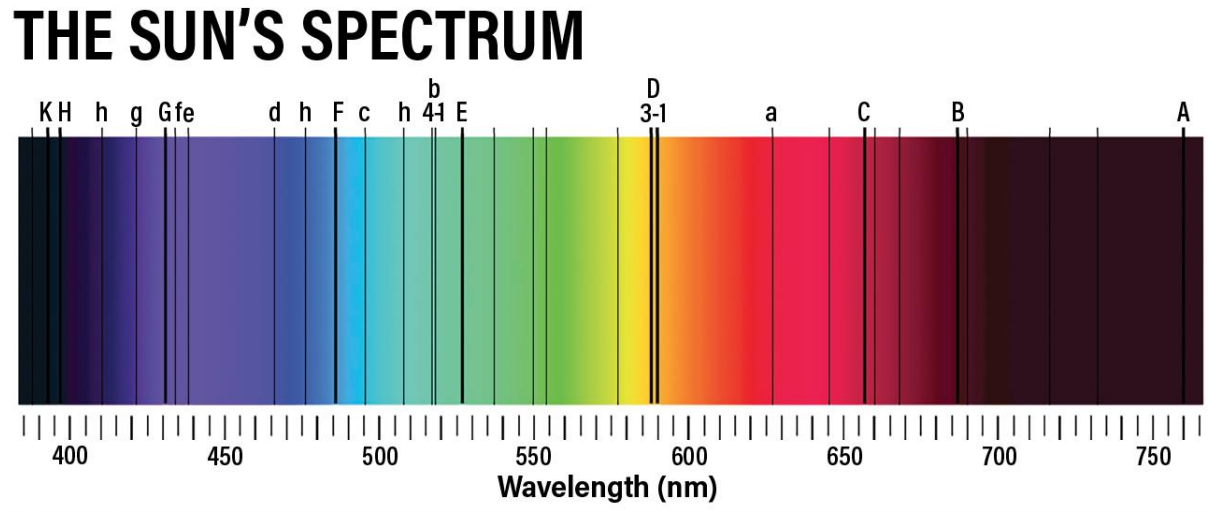
MIDTERM 1 REVIEW: MC

1. Which star is farthest from Earth and **why**?

	STAR	APPARENT MAGNITUDE (m)	ABSOLUTE MAGNITUDE (M)	SPECTRAL TYPE	LUMINOSITY CLASS
(a)	Antares	+0.9	-4.5	M1	I
(b)	Arcturus	-0.05	-0.2	K2	III
(c)	Rigel	+0.1	-7.1	B8	I
(d)	Alpha Cen A	0.0	+4.4	G2	V
(e)	Altair	+0.8	+2.2	A7	IV

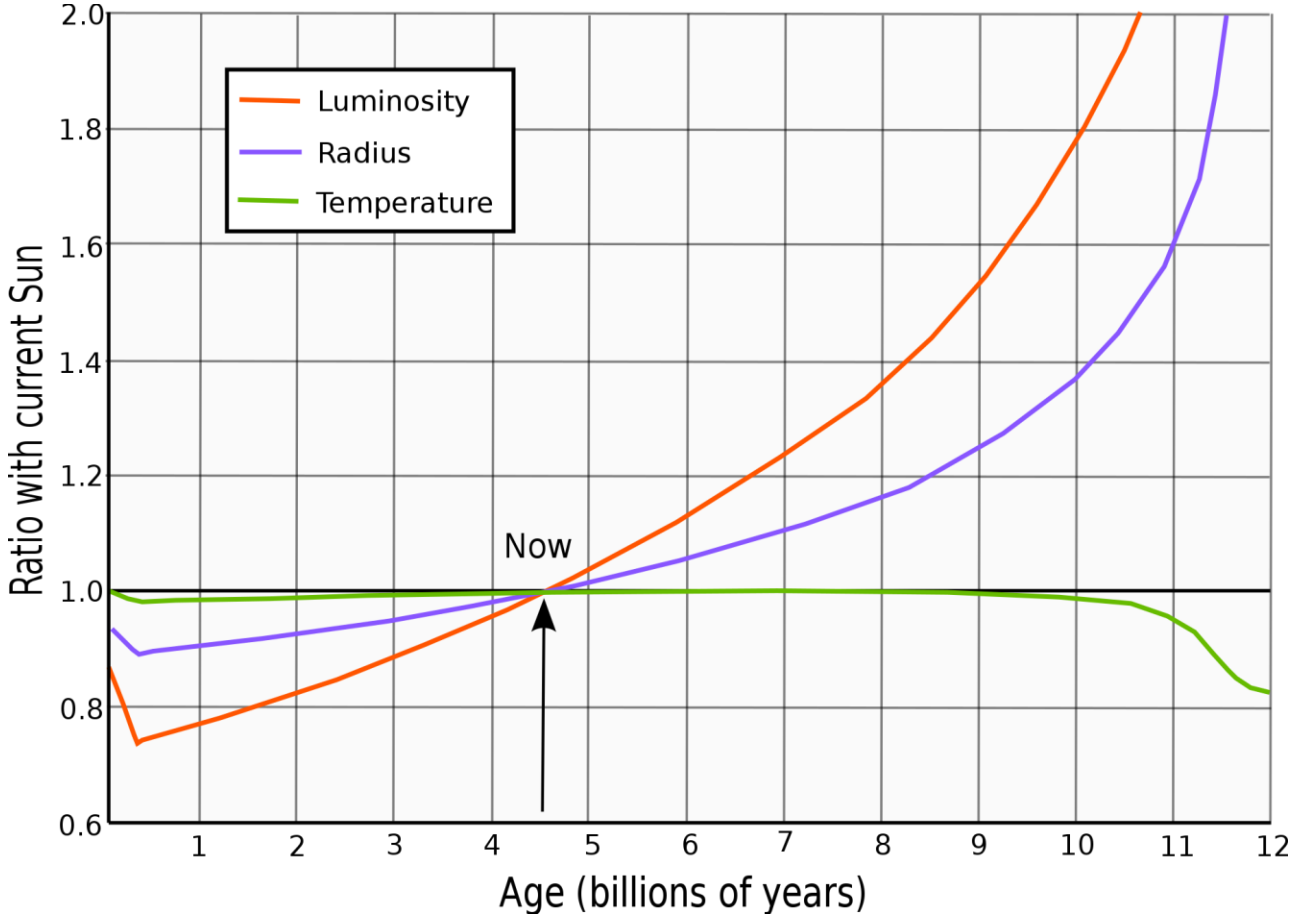
2.18 **Astronomers are planning to spectroscopically observe a K type star with effective surface temperature $T_\star = 3600\ K$. If it's known that there's a gas cloud with temperature $T_{\text{☁}} = 100\ K$ directly between Earth and the K type star, what should the astronomers expect to see in the star's spectrum at wavelengths where the gas cloud has spectral lines? *Hint: think about the Sun***

a) absorption features
b) emission features
c) blackbody/thermal continuum
d) all of the above
e) the future

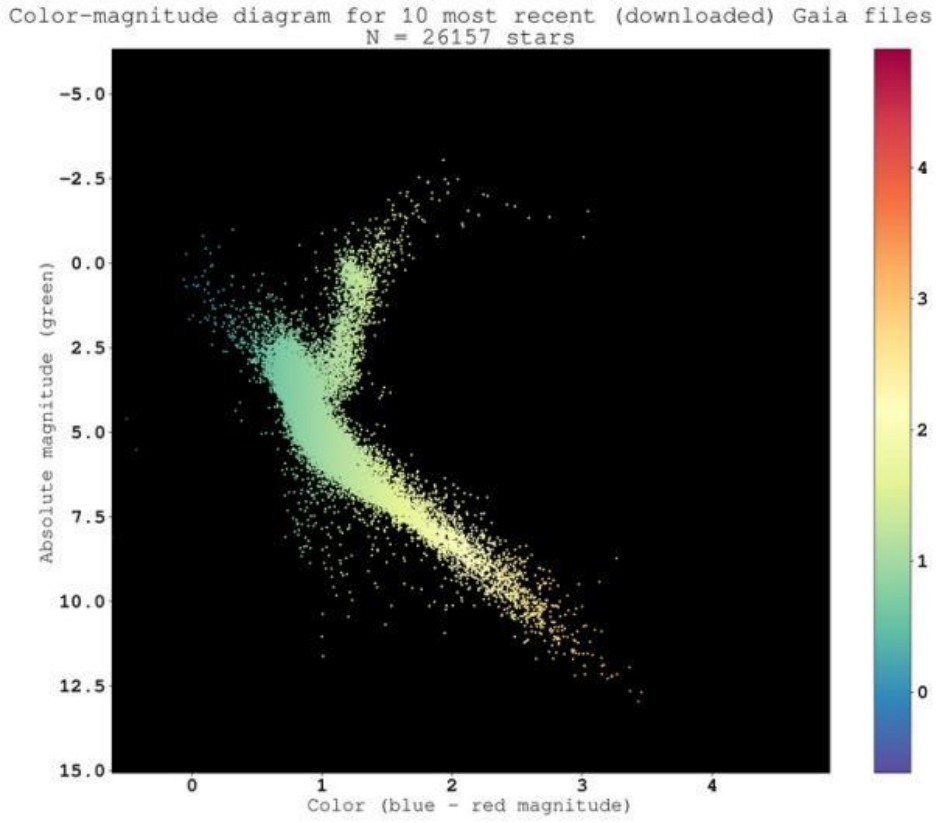


MIDTERM 1 REVIEW: QUALITATIVE

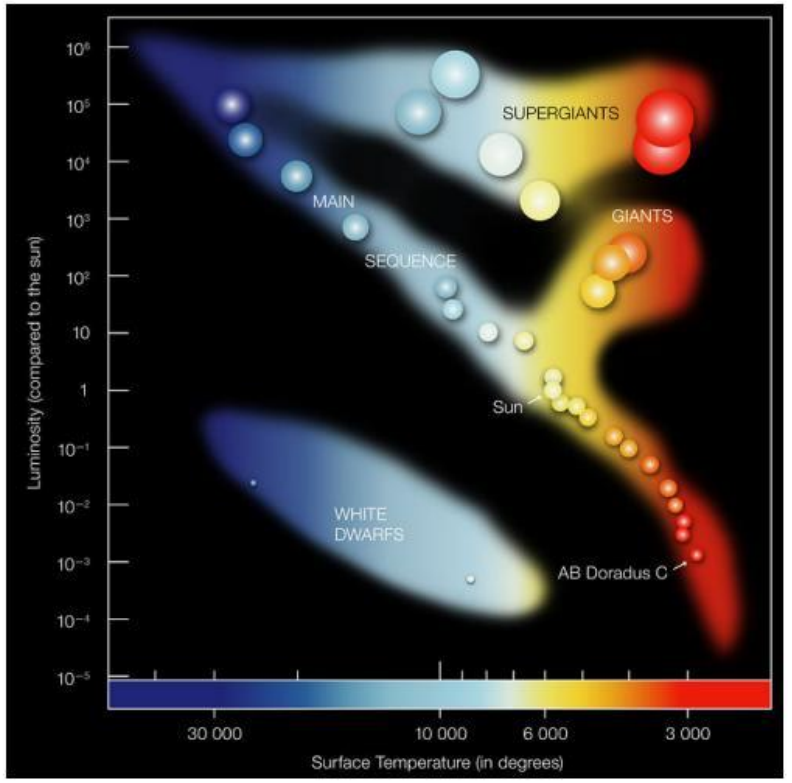
Why is the Sun gradually getting brighter?



MIDTERM 1 REVIEW: QUALITATIVE



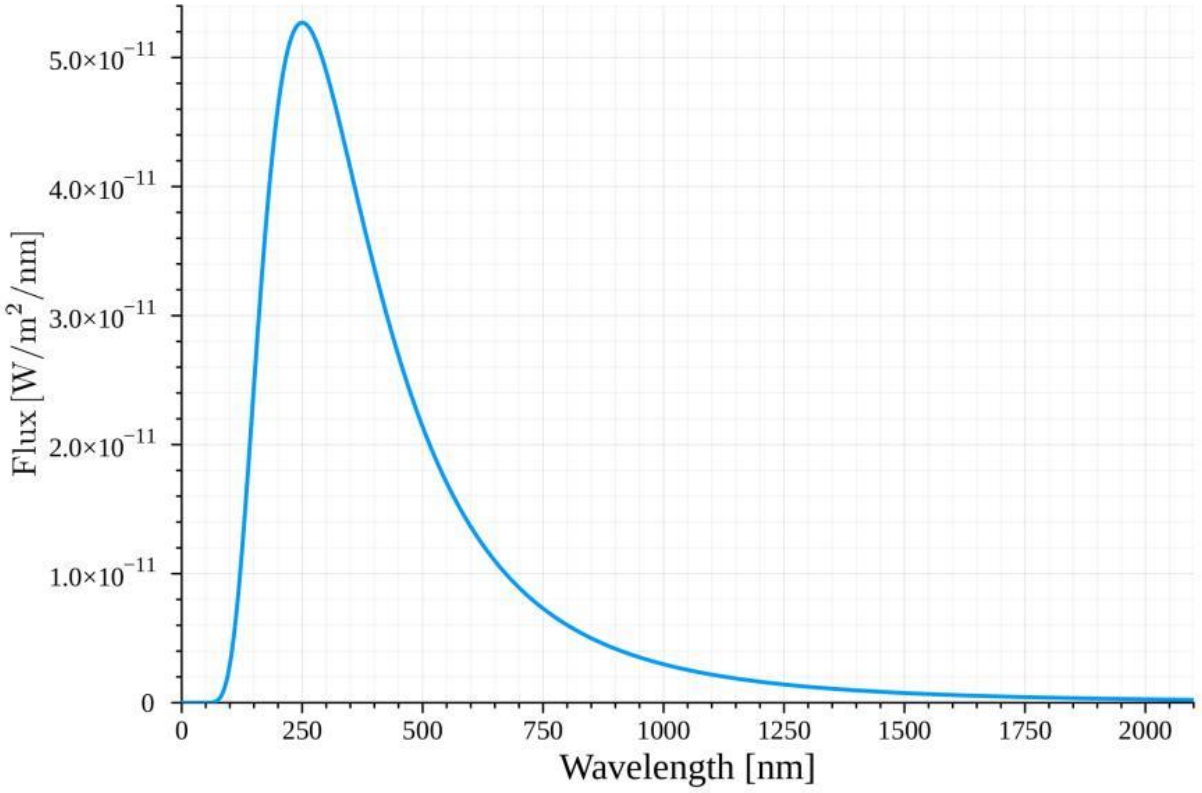
(a) Gaia color-magnitude diagram



(b) Standard HR diagram as seen in class

1. How are the axes the "same"?
2. Why doesn't the Gaia one look like the textbook?

MIDTERM 1 REVIEW: QUANTITATIVE



How do we calculate the temperature, luminosity, and radius from this spectrum + a parallax angle of 0.13"?

MIDTERM 1 REVIEW: QUANTITATIVE

4.2 Properties of stars 2 (18 points)

Two stars are orbiting each other in a binary system. We take spectra of them over several years and find they have an orbital period of 1 year. We additionally find that star 1 has an orbital velocity of 0.22 km/s and star 2 has an orbital velocity of 110 km/s. Parallax measurements indicate a parallax of 0.1", allowing us to infer their intrinsic luminosities to be 8×10^5 $L_\odot$ and 3×10^{-3} $L_\odot$.

1. Estimate the mass of each star, **assuming the orbits are circular.**

2. If the stars were born at the same time 1 million years ago and the brighter one just turned off the MS, when will the fainter star turn off?

PROBLEM SET 5 QUESTIONS / BRAINSTORMING

Have an idea but not sure if it counts? Ask!

Have an idea but not sure where to start? Ask!

Doing one of our problems and not sure what to do? Ask!

Work together and be creative!