Hertzsprung-Russell Diagram

Parallax Formula

Intensity, Power, and Distance

Absolute Magnitude

Introduce Hertzsprung-Russell Diagram

Physics 090

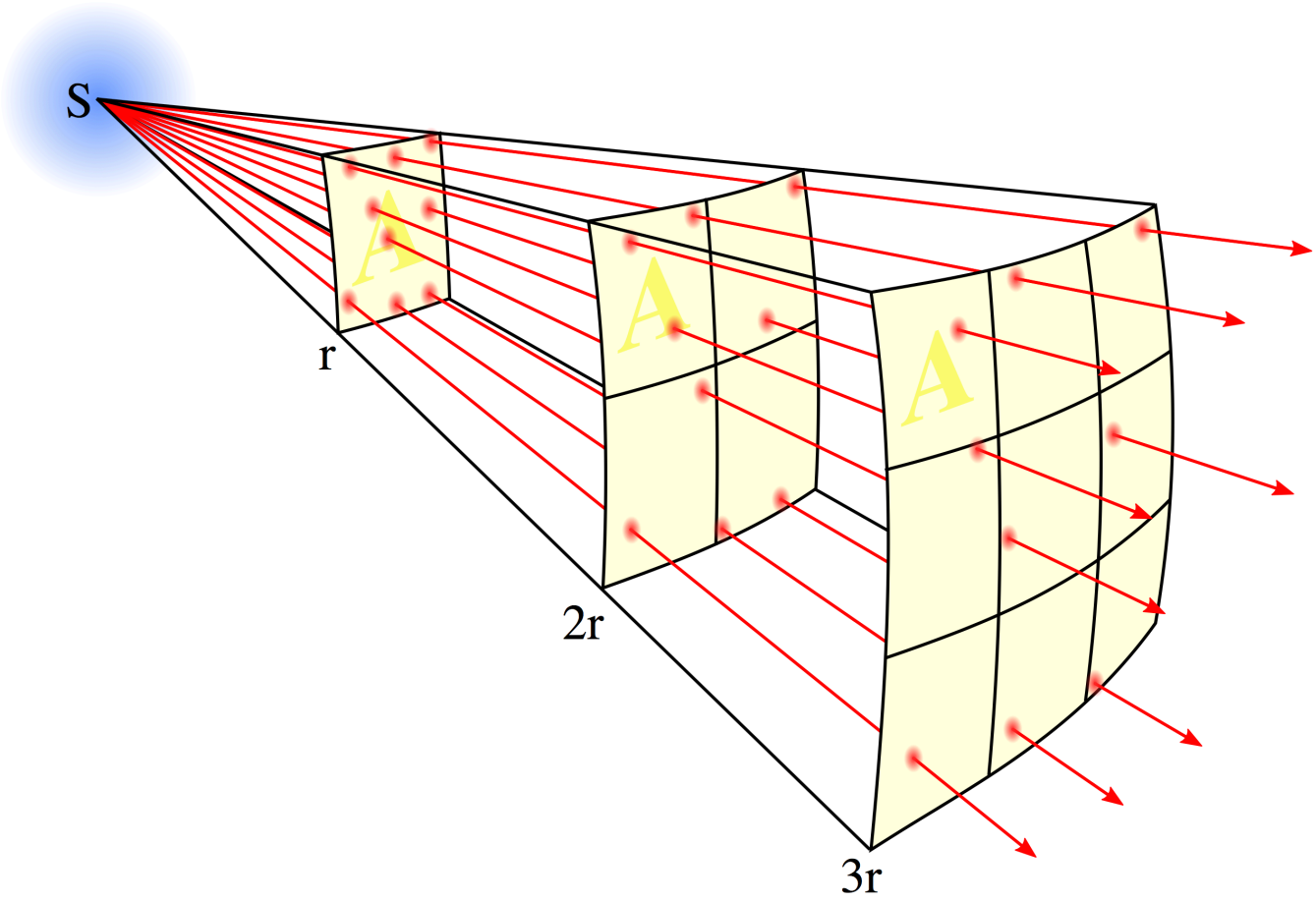
2020-04-20

SAINT MARY'S COLLEGE of CALIFORNIA

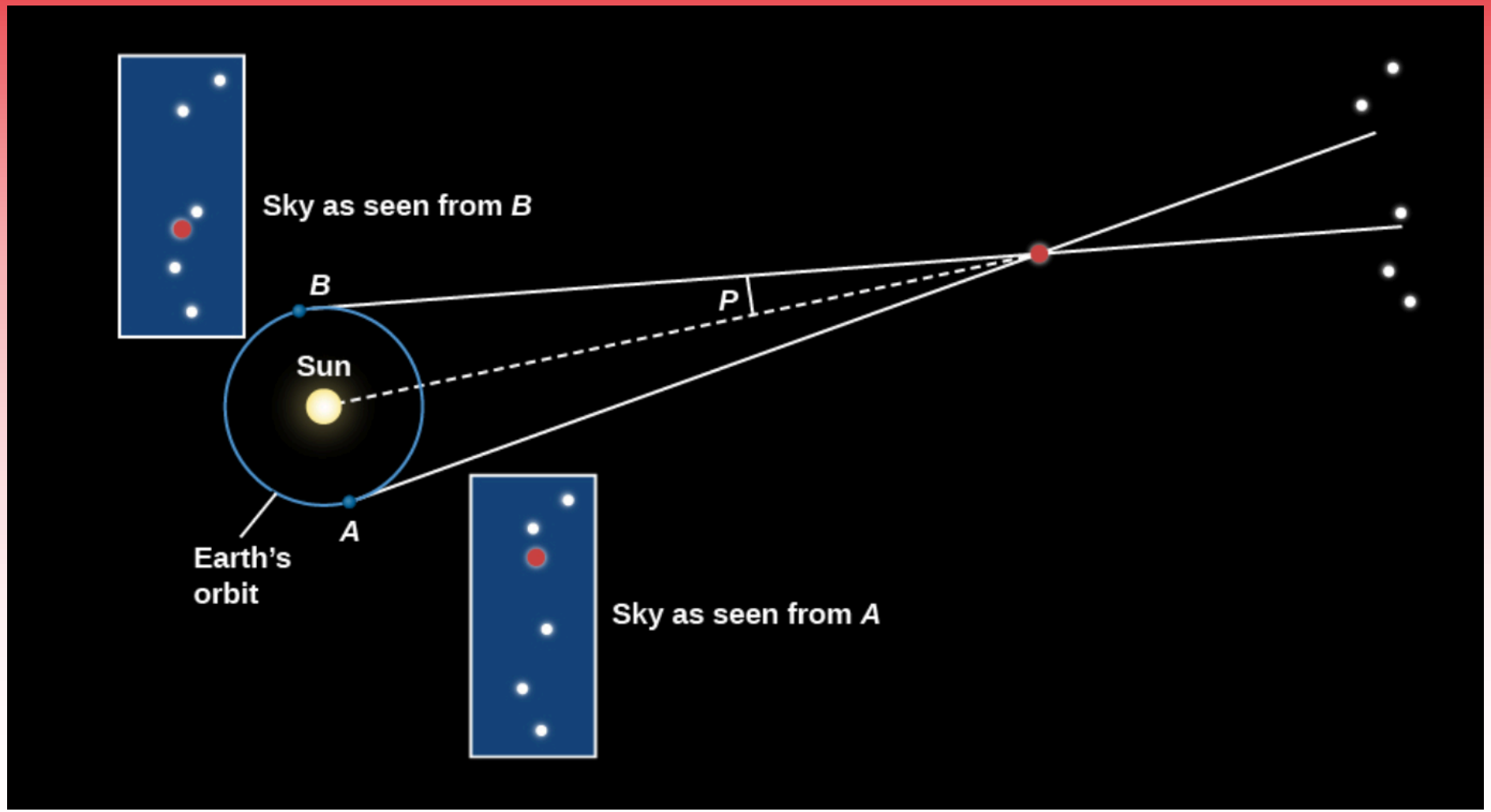
$$I = \frac{L}{4 \pi R^2}$$

or

$$L = 4 \pi R^2 I$$



Luminosity, Intensity, and Distance



Parallax Angle

1 A.U. = 1.496×10^{11} m

1 parsec = 3.086×10^{16} m

1 light-year = 0.9461×10^{16} m

Definitions are Much More Important for Understanding than the Values

Absolute Magnitude

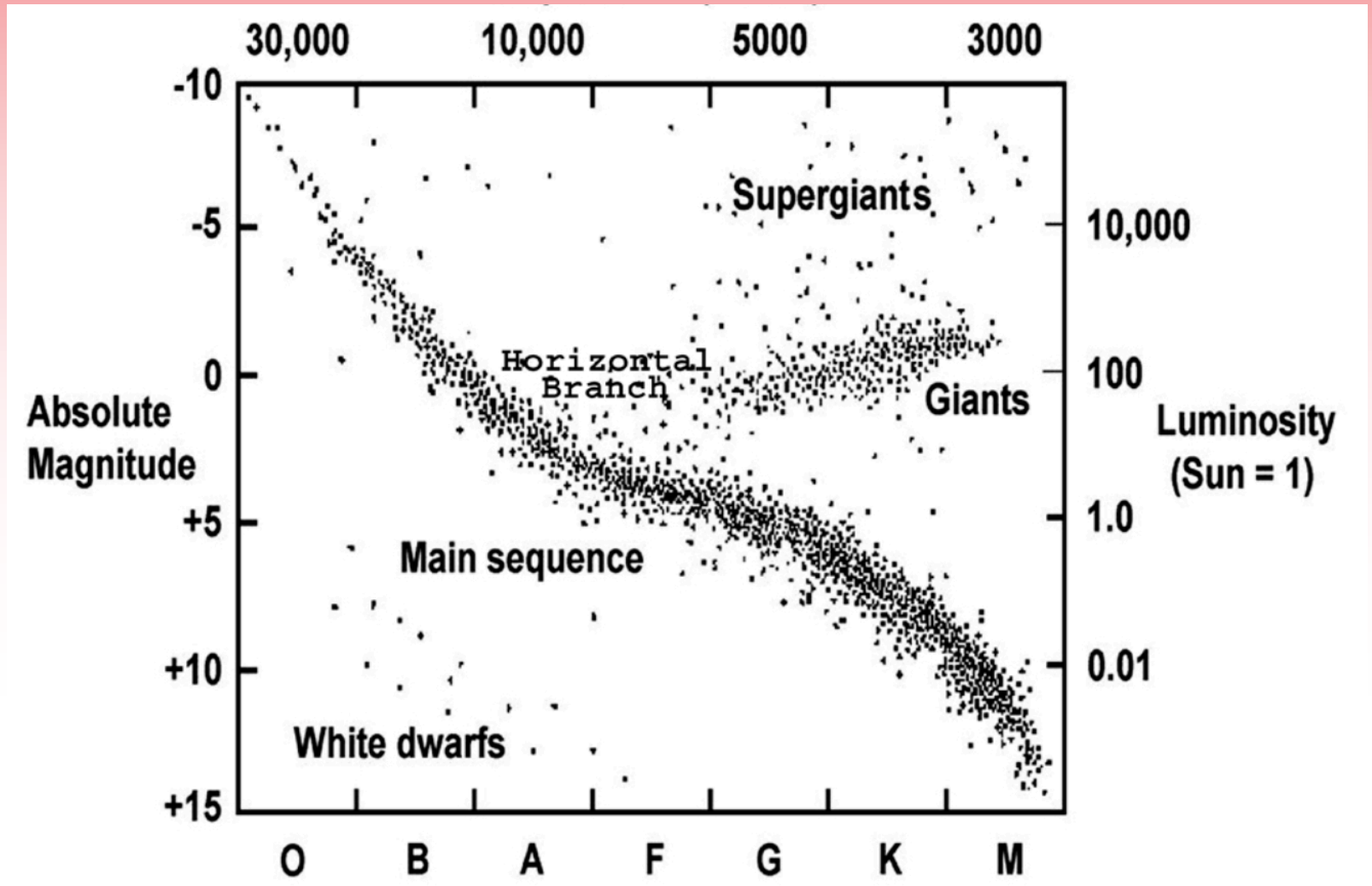
The apparent magnitude of a star
if it were moved to the 'standard' distance of
10 parsecs.

Example:

Our Sun: Apparent Magnitude -26.74
Actual Distance 1 A.U. = 1.496×10^{11} m
Move to 10 parsecs = 3.086×10^{17} m
Get magnitude of 4.83

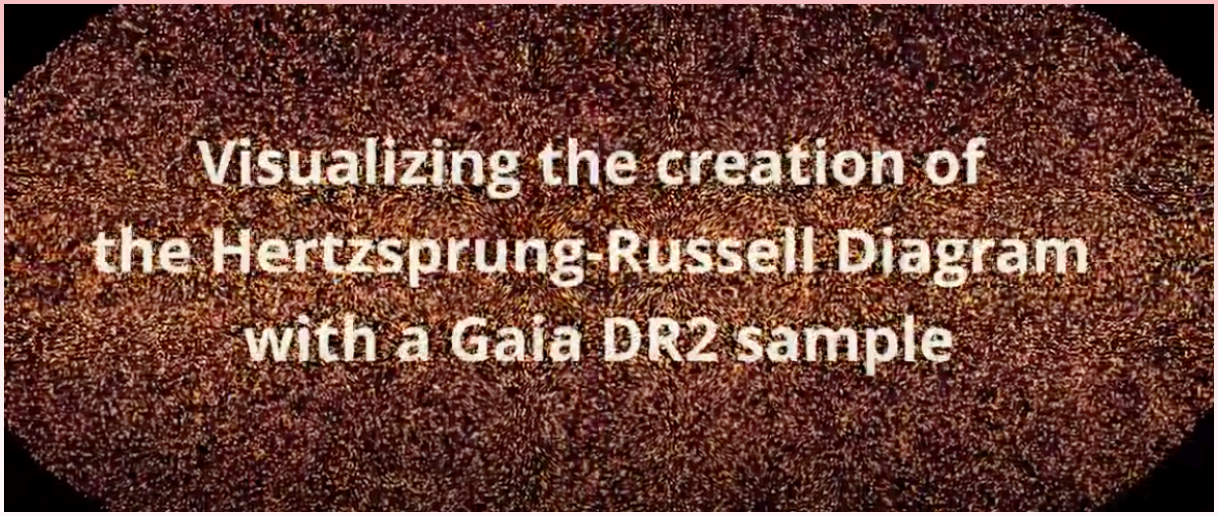
Classifying the Stars

Hertzsprung-Russell Diagram



ESA Visualization: Sorting the Stars

https://youtu.be/jutw-IOwriw



1. Sort Horizontally by Color
2. Sort Vertically by Absolute Magnitude (Luminosity)

See also ESA GAIA Mission: https://youtu.be/Q_SnUBqXTEs

Another Hertzsprung-Russell Diagram (with 23,000 nearby stars)