

Workshop on Day 1 Material

1. Use Wien's Displacement Law to calculate the spectral peak of a red giant star whose surface temperature is 3500K – express your answer in nanometers (nm). Repeat the calculation for the Earth.
2. The luminosity of the Sun is 4×10^{26} W and the Earth-Sun distance (the Astronomical Unit = 1 AU) is 1.5×10^{11} m. What is the energy flux in W m^{-2} at the distance of the Earth (this is called the Solar Constant).
3. A star has a luminosity of 8×10^{26} W and a diameter of 8×10^8 m. Use the Stefan-Boltzmann law to estimate its surface temperature. (Stefan's constant $\sigma = 5.67 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$)
4. A star has twice the diameter and twice the surface temperature of the Sun. How will its luminosity compare to that of the Sun?