

Solar Physics 2010: Exercises to Lecture 1

Due: 6. May 2010 at 13:15

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1 Stix problem 1.1: Elliptical Orbit

In which sense of the word “mean” is the semi-major axis of an elliptical orbit the mean distance?

2 Stix problem 1.2: Energy flux and intensity

Show that the energy flux $F(\lambda)$ is π times the intensity averaged over the visible solar disk.

3 Stix problem 1.4: Spectral irradiance

Calculate the spectral irradiance for the wavelength and brightness temperature values given in the text. Estimate the error arising from the Rayleigh-Jeans approximation of Planck's law.

4 Stix problem 1.5: Total solar irradiance

Use the Rayleigh-Jeans approximation for an estimate of the entire solar irradiance above any given wavelength. Show that about 0.06% of the Sun's energy is emitted in the far infrared, at $\lambda > 10\mu\text{m}$.