Example 1.2   The spectral density of the sun peaks at a wavelength of 900 nm. If the sun behaves as a black body, what is the temperature of the sun?

Solution   A wavelength of 900 nm corresponds to a photon energy of:

$$E_{ph} = \frac{hc}{l} = \frac{6.626 \times 10^{-34} \times 3 \times 10^{8}}{900 \times 10^{-9}} = 2.21 \times 10^{-19} \text{ Joule}$$

Since the peak of the spectral density occurs at $2.82 \, kT$, the corresponding temperature equals:

$$T = \frac{E_{ph}}{2.82 \, k} = \frac{2.21 \times 10^{-19}}{2.82 \times 1.38 \times 10^{-23}} = 5672 \text{ Kelvin}$$