

Answer on Question #45875 – Physics – Astronomy – Astrophysics

Question:

A star has surface temperature of 25000 K. Which lines will be prominent in its spectrum? Justify your answer.

Answer:

The peak wavelength in the star spectrum (λ_{\max} , m) may be derived from the effective temperature of the star's surface according to the Wien's displacement law, if we assume that the spectrum of star is close to the blackbody spectrum.

Then, $\lambda_{\max} = 2.898 \times 10^{-3} / T$, where T – absolute temperature of the star's surface, K

From Wien's law we can calculate the peak wavelength (λ_{\max}) for a star with the surface temperature 25000 K: $\lambda_{\max} = 2.898 \times 10^{-3} / 25000 \approx 120 \times 10^{-9} \text{ m} = 120 \text{ nm}$.