3.21) WHITE DWARF STARS HAVE BEEN OBSERVED WITH $T_{SURF} = 200{,}000°C$. WHAT IS THE WAVELENGTH OF THE MAXIMUM INTENSITY?

USING WIEN'S LAW

$$\lambda_{MAX}\, T = 2.898 \times 10^{-3}\ m \cdot K \qquad (3.14)$$

GIVES

$$\lambda_{MAX} = \frac{2.898 \times 10^{-3}\ m \cdot K}{T}$$

WITH $T = 200{,}273\ K$ (AS IF THAT 273K MATTERS!)

$$\lambda_{MAX} = \frac{2.898 \times 10^{-3}\ m \cdot K}{200273\ K}$$

$$\lambda_{MAX} = 1.45 \times 10^{-8}\ m$$

$$\lambda_{MAX} = 14.5\ nm$$ ← IN THE EXTREME UV RANGE!

NEED A UV TELESCOPE TO OBSERVE THESE!

3.23) A TUNGSTEN FILAMENT OF A TYPICAL INCANDESCENT LIGHT BULB OPERATES AT T = 3,000 K. AT WHAT WAVELENGTH DOES IT EMIT THE MAXIMUM INTENSITY?

USING WIEN'S LAW:

$$\lambda_{MAX} = \frac{2.898 \times 10^{-3}\ m \cdot K}{T} = \frac{2.898 \times 10^{-3}}{3000}$$

$$\lambda_{MAX} = 9.66 \times 10^{-7}\ m$$

$$\Rightarrow \lambda_{MAX} = 966\ nm$$

WHICH IS IN THE IR

... MORE HEAT THAN LIGHT