Length Conversion

Friday, April 27, 2018 7:10 AM

$$\int_0^{\infty} B(\lambda, T)\, d\lambda = \int_{\infty}^{0} B\left(\lambda = \frac{1}{K}, T\right) \frac{d\lambda}{dK}\, dK$$

$$\lambda = \frac{1}{K} \qquad \frac{d\lambda}{dK} = \frac{d}{dK}\left(\frac{1}{K}\right) = \frac{-1}{K^2}$$

$$\int_{\lambda=0}^{\infty} B(\lambda, T)\, d\lambda = -\int_{K=0}^{\infty} B\left(\frac{1}{K}, T\right) \left[\frac{-1}{K^2}\right] dK$$

$$B(\lambda, T) = \frac{1}{K^2}\, B\left(\lambda = \frac{1}{K}, T\right)$$

$$B(\lambda, T) = \lambda^2\, B(\lambda, T)$$

$$\frac{W}{cm^2\, Sr\, \mu m} = \frac{W\, \mu m}{cm^2\, Sr}$$

$$\frac{W\, \mu m}{cm^2\, Sr} = \frac{(1000\, mW)\,(1e^{-4}\, cm)}{cm^2 \left(\frac{m^2}{(100\, cm)^2}\right) Sr}$$

$$= \frac{1000\, mW\, cm}{m^2\, Sr}$$

$$\lambda^2\, \{m^2\} = 1 \times 10^{12}\, \lambda^2\, \{\mu m\}$$

$$B(\lambda, T) = \lambda^2\, B\left(\frac{1}{K}, T\right)$$

$$B(\lambda, T)\left\{\frac{W}{cm^2\, Sr\, \mu m}\right\} = 1 \times 10^{15}\, \lambda^2\, B\left(\frac{1}{K}, T\right) \left\{\frac{mW\, cm}{m^2\, Sr}\right\}$$