

4-12

~~at~~ ¹⁶

$$d = 2.47 \times 10^{-10} \text{ m}$$

$$2d \sin \theta = n\lambda$$

$$\begin{aligned} \text{desired } \lambda &= \frac{h}{\sqrt{2mK}} = \frac{4.136 \times 10^{-15} \text{ eV}\cdot\text{s}}{\sqrt{2 \cdot 931.6 \times 10^6 \text{ eV} \cdot 0.0105}} \\ &= \frac{4.136 \times 10^{-15} (3 \times 10^8)}{\sqrt{2 \cdot 931.6 \times 10^6 \cdot 0.0105}} \\ &= 2.793 \times 10^{-10} \text{ m} \end{aligned}$$

a scattering angle that includes this energy is therefore

$$\sin \theta = \frac{2.793 \times 10^{-10} \text{ m}}{2 \cdot 2.47 \times 10^{-10} \text{ m}} = 0.5654$$

~~the beam will~~

$$\theta =$$

The beam will include other energies; let $n=2$, for example, and

$$2d \sin(0.5654) = 2\lambda$$

gives a different beam energy present