

43 to resolve an object w/ diameter  $d$ , must have

$$\Delta x < d \Rightarrow \Delta p > \frac{h}{\Delta x} > h/d$$

But  $\Delta p \approx P_{min} = \sqrt{2mK}$

$$\sqrt{2mK} > h/d$$

$$K > \frac{h^2}{2m_e d^2}$$

for electrons, if  $K$  is measured in eV,  
and  $m_e$  in  $e/c^2$ , Voltage =  $K$ , numerically

So

$$V_{acc} = \frac{(4.136 \times 10^{-15})^2 (3 \times 10^8)^2}{(2\pi)^2 2 (5.11 \times 10^5) d^2} \text{ Volts}$$
$$= \frac{3.81 \times 10^{-20}}{d^2} \text{ Volts}$$

a)  $d = 1.2 \times 10^{-8} \text{ m}$   
 $V = 2.65 \times 10^{-5} \text{ V}$

b)  $d = 1.2 \times 10^{-10} \text{ m}$   
 $V = 2.65 \times 10^{-1} \text{ V}$

c)  $d = 1.2 \times 10^{-15} \text{ m}$   
 $V = 2.65 \times 10^9 \text{ V}$