

## How small *is* small?

	Maximum Magnification	Optimal Resolution
Unaided human eye (normal vision)	--	0.1 mm @ 10 in
Light microscope	1000X	0.2 $\mu\text{m}$
Fluorescence LM	(1000X)	10 nm
Interference LM	(1000X)	1 nm
Scanning electron microscope	~ 1 million X	~1 nm
<b>JEOL JSM-6490LV (optimal)</b>	<b>5X – 100,000X</b>	<b>3 nm</b>
Transmission electron microscope	~ 1.5 million X	~ 0.5 $\text{\AA}$

$$1 \text{ mm} = 1000 \mu\text{m} = 10^{-3} \text{ m}$$

$$1 \mu\text{m} = 10^{-6} \text{ m} = 1000 \text{ nm} = 10,000 \text{ Angstroms } (\text{\AA})$$

Human hair is ~ 50  $\mu\text{m}$  diameter

Lower limit of vision ~ 40  $\mu\text{m}$

Typical human cells are ~ 10  $\mu\text{m}$  diameter (range ~ 5-100  $\mu\text{m}$ )

Common bacteria are ~ 2  $\mu\text{m}$  diameter

Atoms in a solid are separated by ~ 0.2 nm