

Two Very Important Questions:

1. Where are the electrons in an atom?

Answer:

90% of the time within an orbital

2. What are the energies of the electrons in atoms?

a) Answer (Bohr):

$$E_n = -2.18 \times 10^{-18} \left(\frac{Z^2}{n^2} \right) \text{ (Joules)}$$

b) Answer (Quantum Mechanical):

...Stay Tuned: Chapter 8



What might orbitals look like?

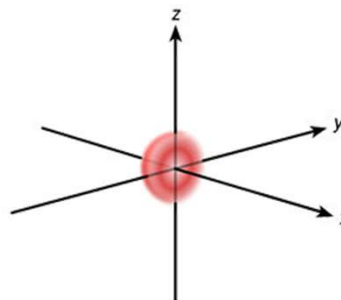
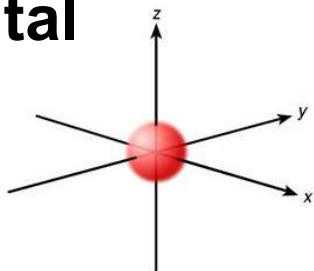
“s” orbitals

1s orbital

$$n = 1$$

$$l = 0$$

$$m_l = 0$$

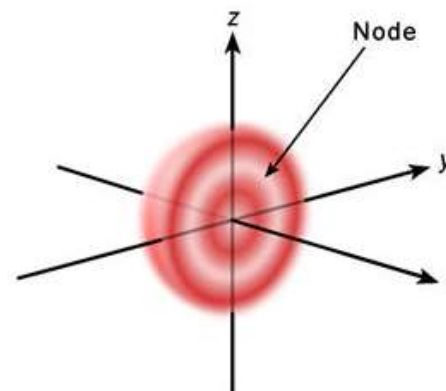
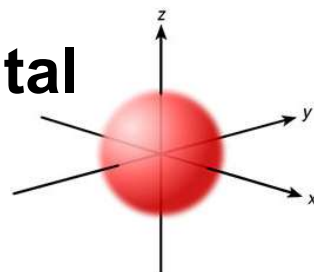


2s orbital

$$n = 2$$

$$l = 0$$

$$m_l = 0$$

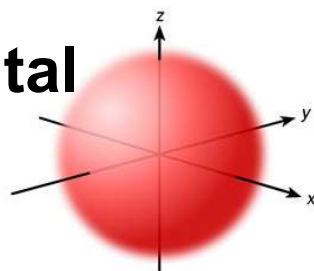


3s orbital

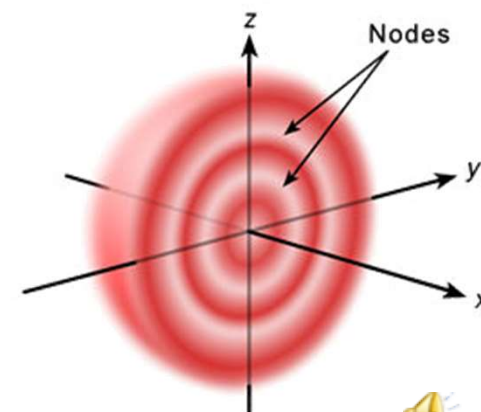
$$n = 3$$

$$l = 0$$

$$m_l = 0$$



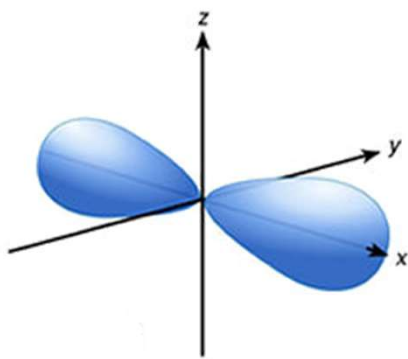
2s, 3s, etc orbitals have regions inside that are electron poor (indicated by nodes)



What might orbitals look like?

“p” orbitals

2p orbitals (Why can't there be 1p orbitals?)

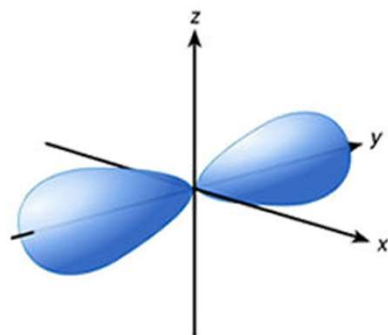


2p_x orbitals

$$n = 2$$

$$l = 1$$

$$m_l = -1$$

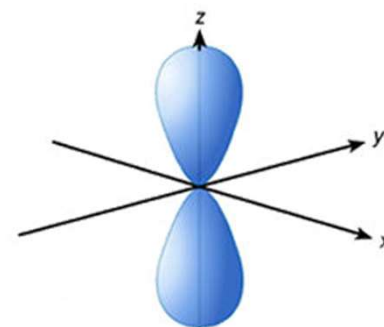


2p_y orbitals

$$n = 2$$

$$l = 1$$

$$m_l = 0$$



2p_z orbitals

$$n = 2$$

$$l = 1$$

$$m_l = +1$$



“d” orbitals (5 of them)

