

## Quantum Numbers

### What are quantum numbers

- Schrödinger's equation explains the electron's most probable position in a hydrogen atom. Several answers come from his equation. These answers are the quantum numbers.
- Like an address for an e<sup>-</sup>
- there are 4 quantum numbers
- n- principle
- l- sublevel
- m<sub>l</sub>-orbital (position)
- m<sub>s</sub>-spin

### Determining n

- n is which energy level the electron is in.
  - It can be 1-7
  - 1 s \_\_\_\_\_
  - 2 s \_\_\_\_\_ p \_\_\_\_\_
  - 3 s \_\_\_\_\_ p \_\_\_\_\_ d \_\_\_\_\_
- ↙ these numbers

### Determining l

- l is the subshell
- which type of orbital the electron is in.
- s=0
- p=1
- d=2
- f=3

### Determining m<sub>l</sub>

- Orbital
- which line is the electron on?
- s 0
- p -1 0 1
- d -2 -1 0 1 2
- f -3 -2 -1 0 1 2 3

### Determining m<sub>s</sub>

- which direction is the electron spinning?
- If the arrow is pointing up it is +1/2
- If the arrow is pointing down it is -1/2

### Example

- $n = 2$
- $l = 1$
- $m_l = -1$
- $m_s = -1/2$

