

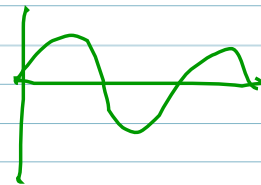
HEISENBERG → UNCERTAINTY PRINCIPLE

→ it is impossible to know both the momentum (p) and the location (x) of an e^- with certainty

$\Delta \Rightarrow$ uncertainty $\Delta p \Delta x = \frac{h}{4\pi}$

SCHRÖDINGER → wave equations

$\psi^2 \Rightarrow$ 3D shape
"probability shape"
 e^- density



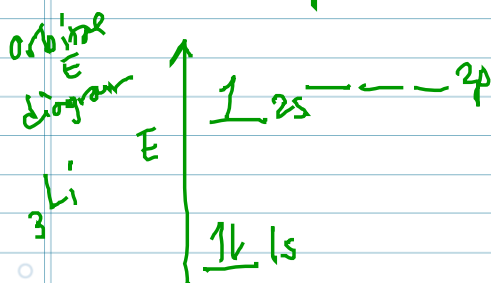
$n \rightarrow$ principal $\Delta n \Rightarrow$ E level "shell"

orbitals → boundary surface diagram
↳ a shape that contains 90% of the e^- density

Pauli Exclusion Principle

→ "if two electrons are in the same energy level and the same orbital they must have opposite spin"

spin: \uparrow, \downarrow $+\frac{1}{2}, -\frac{1}{2}$



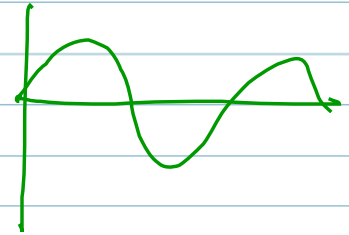
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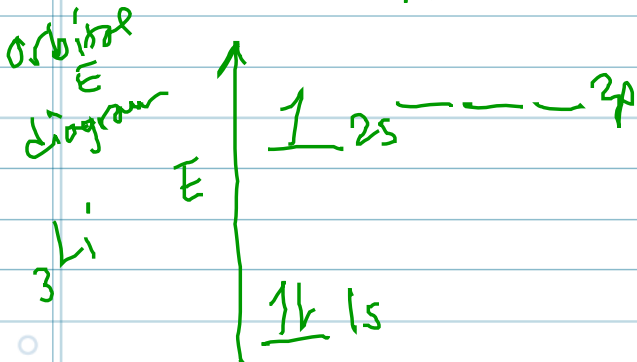
$n \rightarrow$ principal QN \Rightarrow E level "shell"

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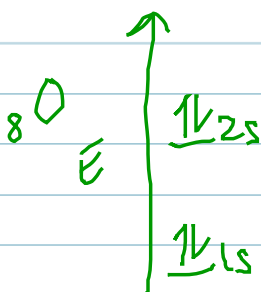
$$\text{spin} = \uparrow, \downarrow \quad +\frac{1}{2}, -\frac{1}{2}$$



AUFBAU PRINCIPLE "fill" orbitals from the lowest E up "ground state"

HUND'S RULE the lowest E arrangement in a single orbital set is the one with the most parallel spins

Why? \Rightarrow minimizes e^-/e^- repulsion



$\uparrow \downarrow \uparrow \uparrow \uparrow 3p$

electron configuration

