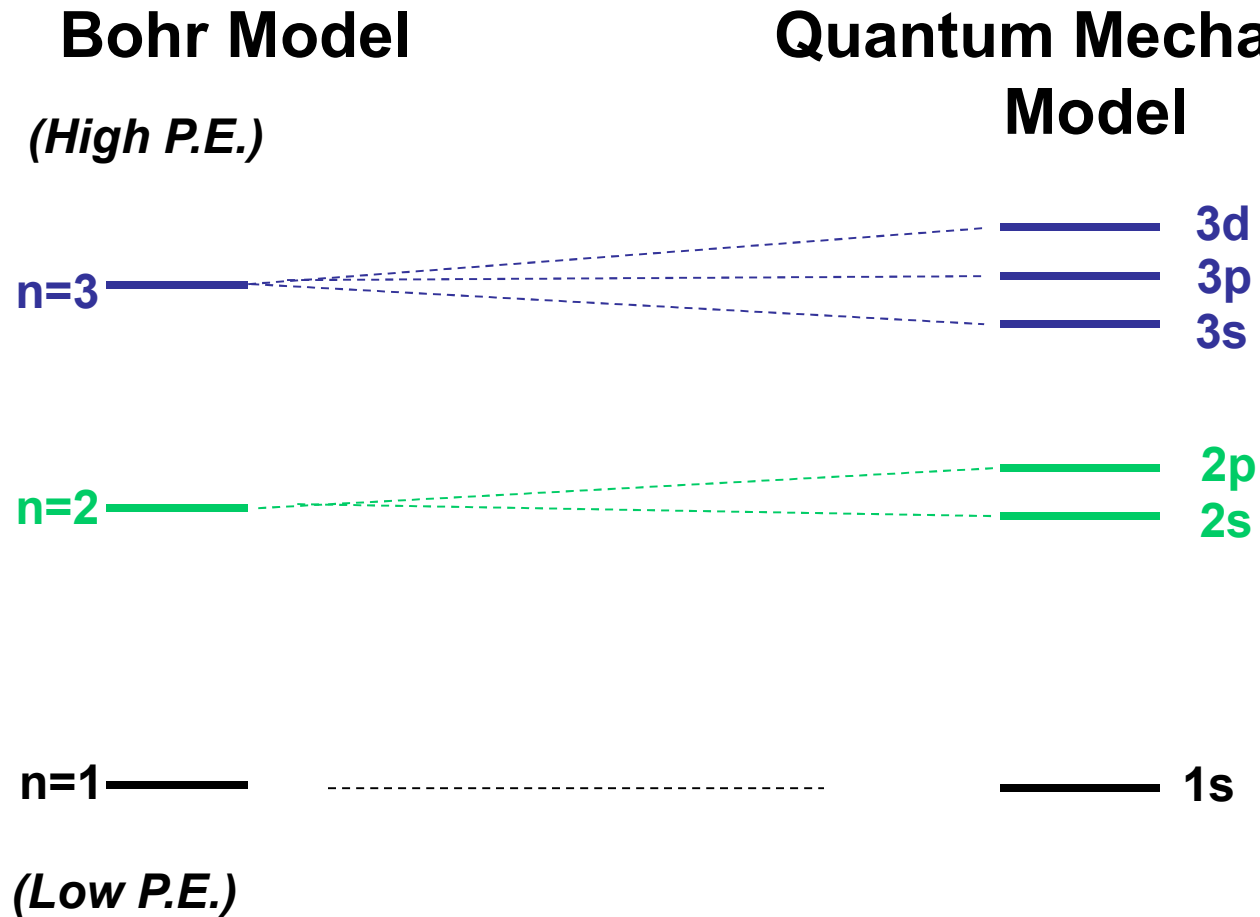


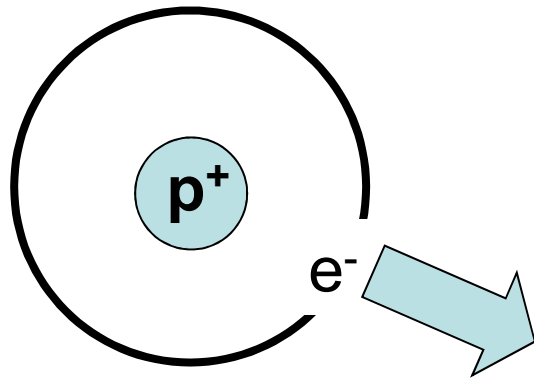
Quantum Mechanics: What are the electron energies?



Factors that affect electron energies: Orbital Size

Hydrogen Atom

1s orbital



- ... e⁻ closer to nucleus
- ... greater e⁻ ... p⁺ attraction
- ... harder to remove e⁻
- ... lower energy e⁻

Remove the
electron and
compare!

High P.E.

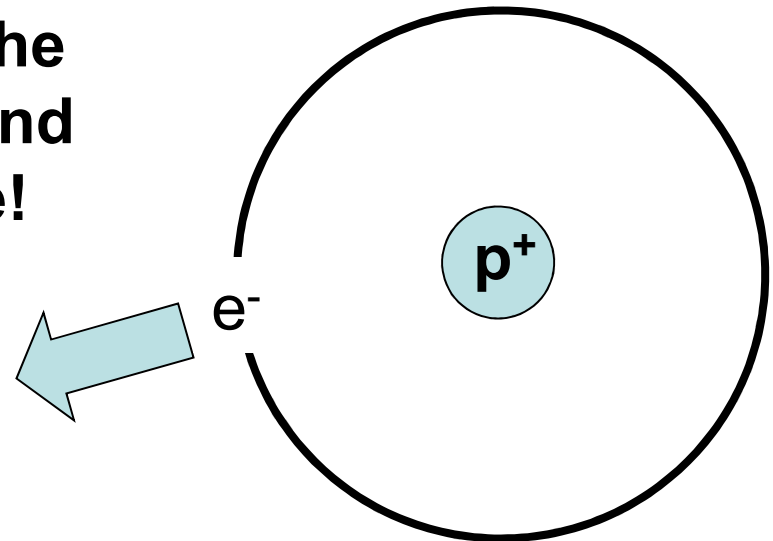
————— 2s

————— 1s

Low P.E.

Hydrogen Atom

2s orbital

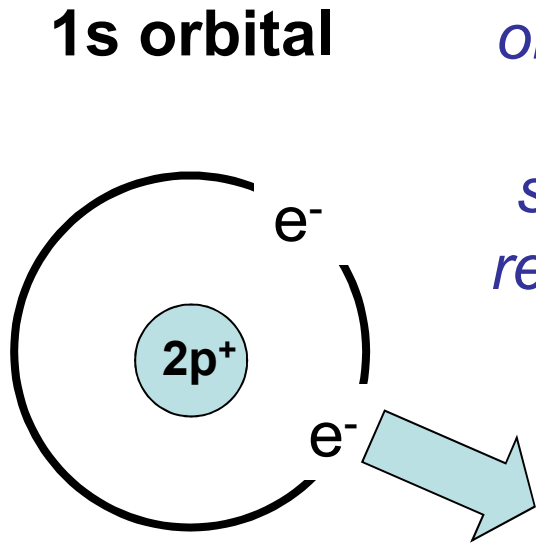


- ...e⁻ further from nucleus
- ... weaker e⁻ ... p⁺ attraction
- ... easier to remove e⁻
- ... higher energy e⁻



Factors that affect electron energies: Additional e⁻

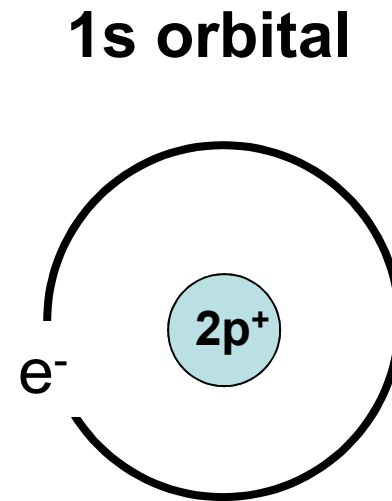
Neutral Helium Atom



The first electron removed from an orbital has higher PE than the second electron removed from the same orbital.

Remove the electron and compare!

He⁺ Cation



...electrons are the *same distance* from nucleus

...1 electron attracted by nucleus

...2 electrons repel each other

... electron easier to remove

... higher energy e⁻

...1 electron attracted by nucleus

...no electron-electron repulsion

... electron harder to remove

... lower energy e⁻

