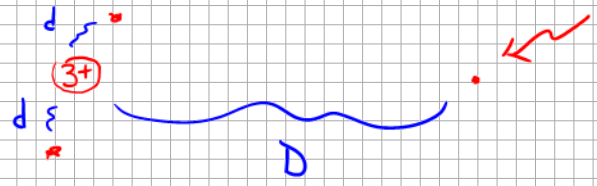
"TYPICAL" SNAPSHOT OF $1s^2 2s^1$, Li:



WHAT CHARGE DOES THE LAST ELECTRON FEEL?

$D \gg d$ $\quad Z_{eff} < Z$

~ 1

SLIGHTLY LARGER THAN ONE.

"TYPICAL" SNAPSHOT OF $1s^2 2s^2$, Be

← HOW DOES THIS AFFECT Z_{eff}

WHAT CHARGE DOES LAST e^- FEEL?

$Z_{eff} \sim 1.5$

(ACTUALLY ALMOST 2)

≡

POTENTIAL ENERGY $= \frac{1}{4\pi\varepsilon_0} \frac{q_1 q_2}{r}$;

q_1: "LAST" ELECTRON

q_2: Z_{eff}

≡

$Z_{eff} = Z - S$;

Z: ACTUAL NUCLEAR CHARGE

S: ELECTRON SCREENING

GOING ACROSS PERIODIC TABLE

Z GOES UP BY ONE

S GOES UP BY < 1

$\therefore$ Z_{eff} INCREASES ACROSS A ROW

≡

$Z_{eff} \approx Z - S \approx$ # VALENCE ELECTRONS

CORE ELECTRONS

OXYGEN: $\underbrace{1s^2}_{\text{CORE}} \underbrace{2s^2 2p^4}_{\text{VALENCE}}$

CORES HAVE FILLED p-BLOCKS

Fe: $\underbrace{1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6}_{\text{CORE}}\ \underbrace{4s^2\ 3d^6}_{\text{VALENCE}}$