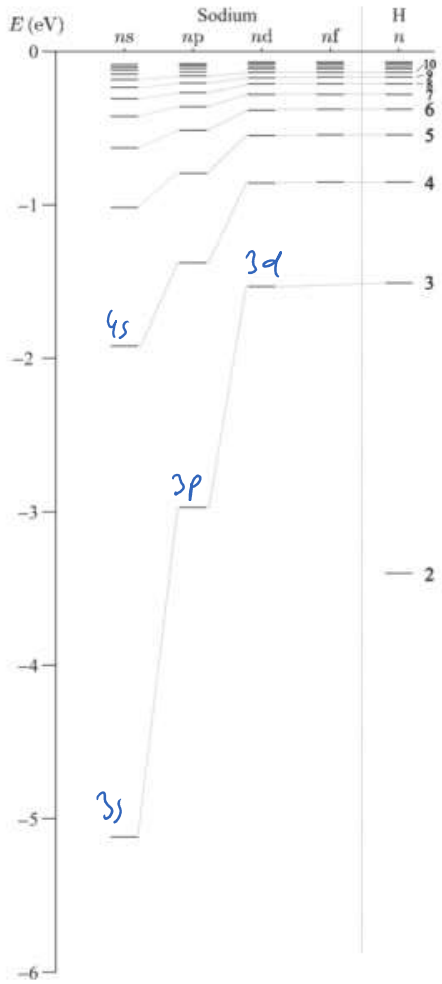
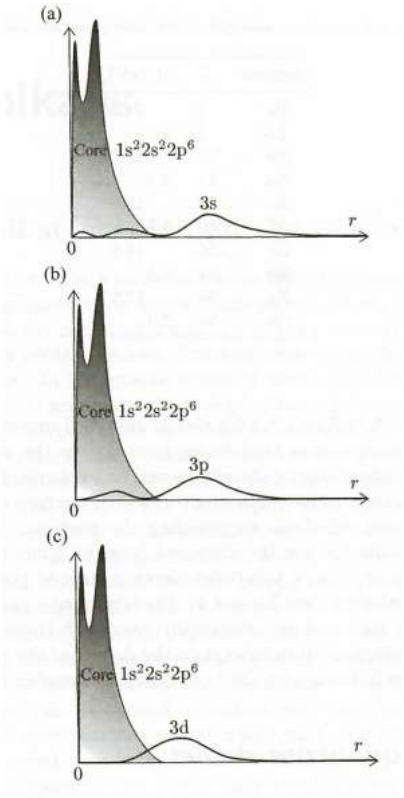
Alkalis

Mittwoch, 23. November 2022 16:10



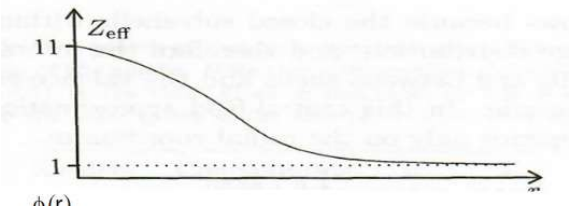
Na

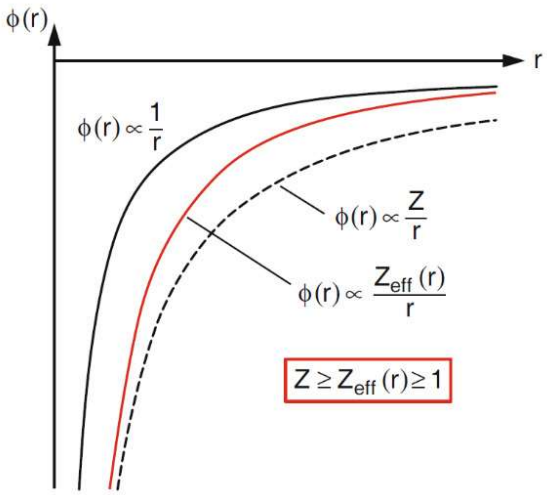


Foot, Atomic Physics

Foot, Atomic Physics

Fig. 4.2 The energies of the s, p, d and f configurations in sodium. The energy levels of hydrogen are marked on the right for comparison. The guidelines link configurations with the same n to show how the energies become closer to the hydrogenic values as l increases, i.e. the quantum defects decrease so that $\delta_l \simeq 0$ for f-electrons (and for the configurations with $l > 3$ that have not been drawn).





Na

— 3d

— 3p

ground state
= lowest total energy

3s — $1s^2 2s^2 2p^6 3s$

→ p.67

$E = \underbrace{2E_{1s} + 2E_{2s} + 6E_{2p}}_{E_{core}} + E_{3s}$

Q: What do we call the 1st excited state?

atomic structure that can be reached with the lowest energy input

g.s. $1s^2 2s^2 2p^6 3s$

1st. excited

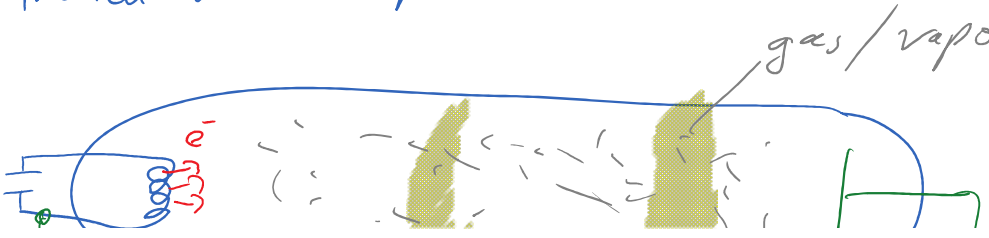
$1s^2 2s^2 2p^6 3p$ ← yes

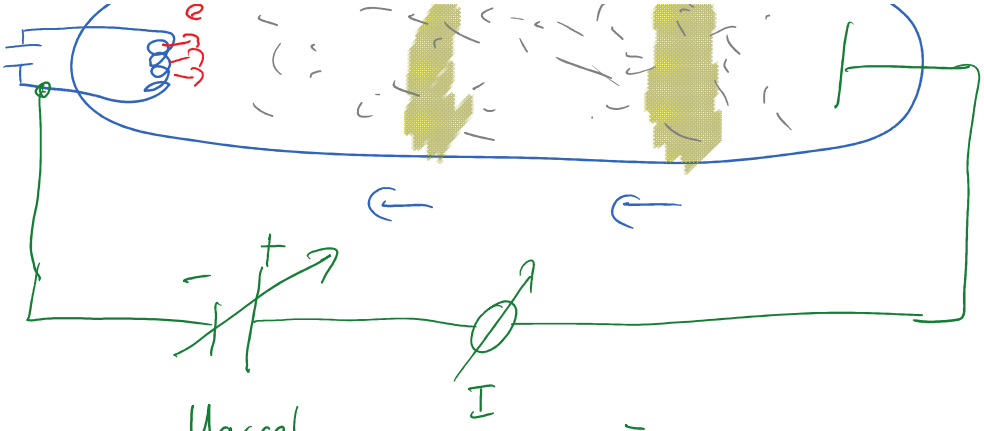
? $1s^2 2s^2 2p^5 3s^2$ why not this?

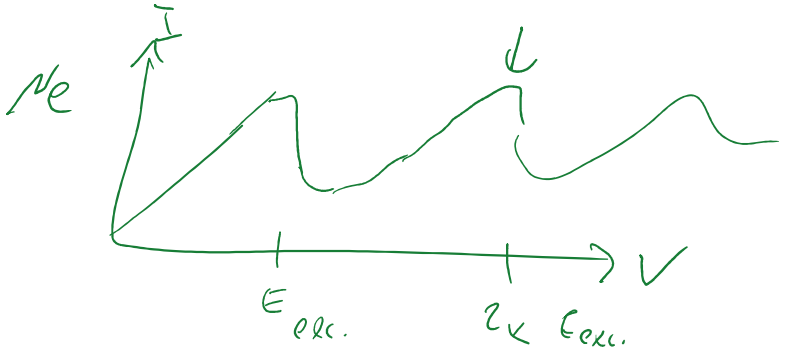
Ne-like core

1st excitation energy Ne : ~ 18eV

Franck-Hertz-experiment





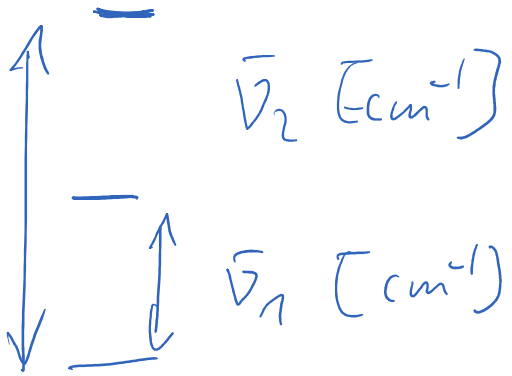


energy units m^{-1}

cm^{-1} = "wavenumbers"

measuring "energies" in $\frac{1}{\lambda}$

$$E = \frac{hc}{\lambda} \qquad \Delta E = \frac{hc}{\lambda}$$



$$\bar{\nu} = \frac{1}{\lambda} \qquad \frac{1}{cm} = 29\ GHz$$

$c = 29 \frac{cm}{ns}$