In this section we examine how the results of the various approximation methods considered in this chapter can be used to understand and predict the physical properties of multi-electron atoms. Our results include total electronic energies, orbital energies and single-electron wavefunctions that describe the spatial distribution of electron density. Physical properties that can be used to describe multi-electron atoms include total energies, atomic sizes and electron density distributions, ionization energies and electron affinities. Trends in these properties as Z increases form the basis of the periodic table and, as we see in Chapter 10, control chemical reactivity. Spectroscopic properties are considered in a link that includes a development of term symbols for multi-electron systems.

Contributors

- Adapted from "Quantum States of Atoms and Molecules" by David M. Hanson, Erica Harvey, Robert Sweeney, Theresa Julia Zielinski