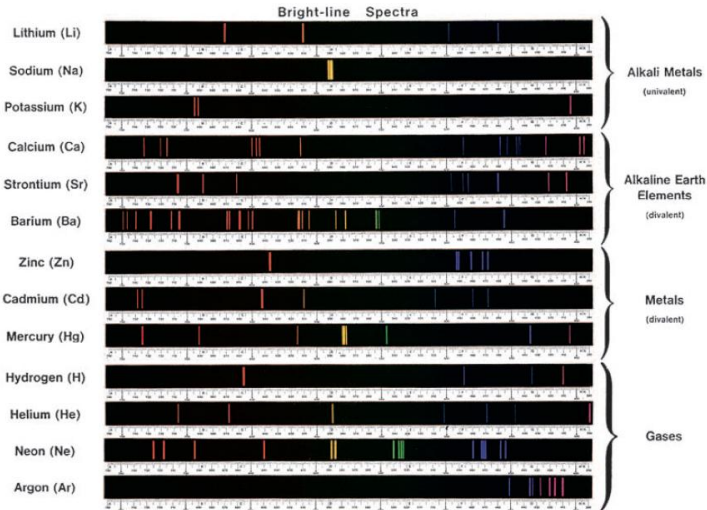


Atoms and Orbitals - Quantization

To explain phenomena at the nanoscale the use of quantum theory is often necessary. One of the fundamental results of quantum theory is the quantization of energy, which can be observed for instance in the emission spectra of atoms.



(from Laird, McGraw Hill)

Fig. 1: Atomic emission lines

Q1. Explain to an audience of non-scientists in a short description what quantization of energy is.

Q2. Explain to an audience of non-scientists what atomic orbitals are and what the origin of quantization of energy is for atomic orbitals. Your discussion should include an explanation of the concept of standing waves, and the concept that matter can be described by waves.

Q3. Explain to an audience of non-scientists how your observations and conclusions made in Q2 form the basis of understanding why atoms show sharp emission lines instead of broad emission bands.