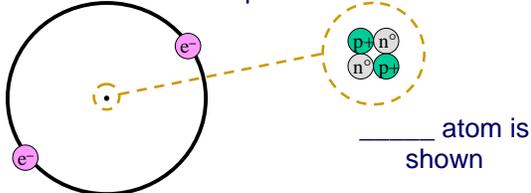


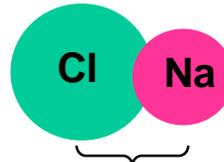
### Background: basic structure

- 6.1: Review (do not have to know details) - shows evidence for the basic atomic model
- Sub-atomic particles include: Protons (p<sup>+</sup>), neutrons (n<sup>0</sup>) and electrons (e<sup>-</sup>)
- n<sup>0</sup>: neutral, massive, in nucleus, e<sup>-</sup>: -ve, small mass, orbits, p<sup>+</sup>: +ve, massive, in nucleus
- Nucleus is small compared to size of atom



### Background: basic structure

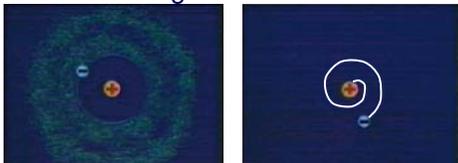
- Previous slide was a single atom
- Let's look at a compound:



- Notice that the nuclei are far apart
- In other words, it's the electrons that are important in bond formation

### Background: Movie

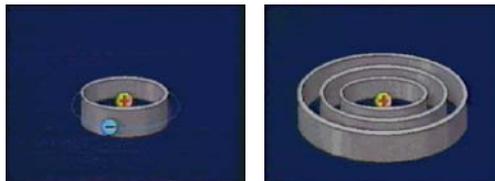
- See OAC movie (0 - 10) 0 - 7: as above
- 7 - 10: Rutherford's model is in trouble: an "accelerated charge" should fall into nucleus



- Bohr revised Rutherford's model to explain the existence of line spectra for elements...
- See Fig 6.10 (pg. 192) or refer to demo (spectroscopes act like prisms to separate light into its component colours)

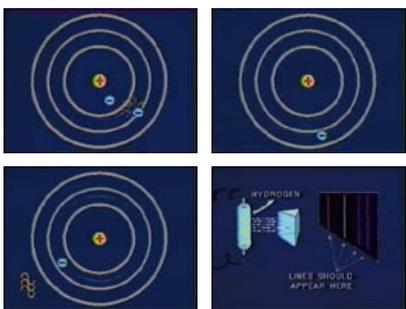
### Movie: electron orbits

- See OAC movie 10 - 14
- 10 - 12: Bohr suggests that electrons can only exist in certain orbits



### Movie: line spectra

- 12 -14: Line spectrum result from the release of photons as electrons fall back to lower orbit

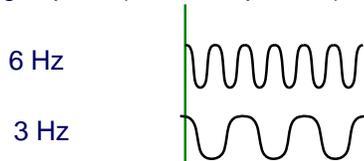


### Light as a wave

- To understand the evidence that led Bohr to his conclusion we must understand something about the nature of light...
- Read pg. 188 - 189
- light is a type of EM energy and has wave properties
- Wavelength and frequency are related by  $\lambda \times \nu = c = 3.00 \times 10^8 \text{ m/s}$
- Frequency (or wavelength) determines the type of radiation (Figure 6.7)

### The speed of EM waves

- Which is a radio wave, which is a visible wave (not drawn to relative scale)
- Observe what happens as they move through space (at same speed: c)



- The longer the wavelength, the smaller the frequency has to be to keep c constant

### The speed of EM waves

Q - Which of the following pairs has the higher frequency:

- visible light or UV (choose one)
- X-rays or radio waves (choose one)

Q - Which of the following pairs has the longer wavelength:

- Infrared or Ultraviolet (choose one)
- Gamma rays or Radio waves (choose one)