

THE QUANTUM MECHANICAL MODEL

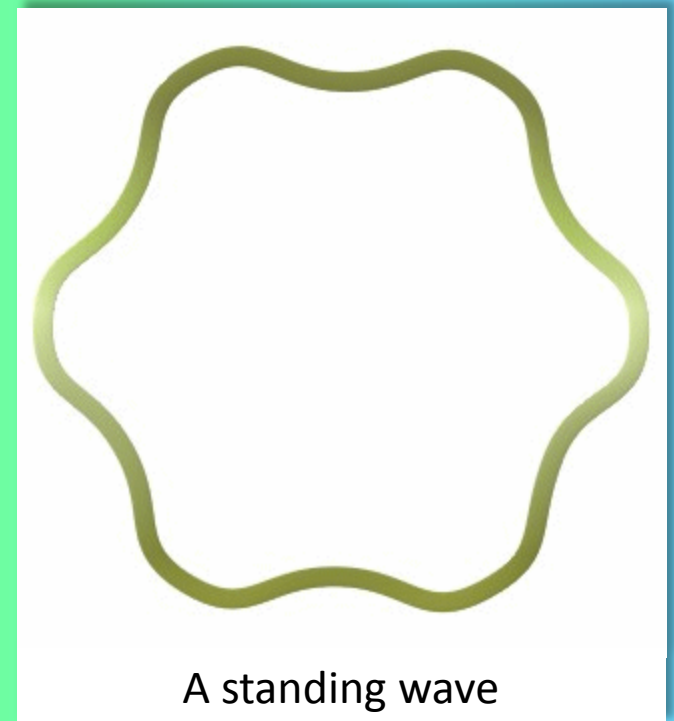
Refining the Bohr Model

BOHR'S FLAWS

- The Bohr model accounts for the line spectrum of hydrogen by postulating that the electrons are stable only in certain energy locations, **but** it does not explain **WHY** !!
- The Bohr model accounts for the line spectrum of hydrogen perfectly, but as soon as an element has more than one electron, Bohr's model no longer accounts for all the energies of light in the spectrum.

ELECTRONS ARE WAVES

- The observation that the energy of an electron is quantized is explained by thinking of the electron as a circular standing wave.
- Standing waves can only be certain sizes because they must have an integral number of wavelengths.



ORBITALS

- The quantum mechanical model explains the bright line spectra by describing the location of electrons in terms of probability rather than by assigning fixed paths.
 - The electron moves freely around the nucleus.
 - The regions of most probable electron location are called orbitals.
 - Orbitals differ in size, shape, and spatial orientation.
 - Similar orbitals are grouped in sublevels (*s*, *p*, *d*, and *f*, etc.)

