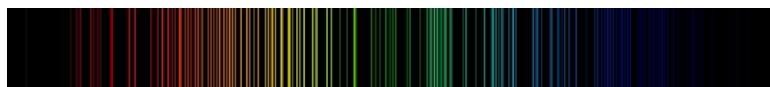


The Bohr Model vs. the Wave Mechanical Model

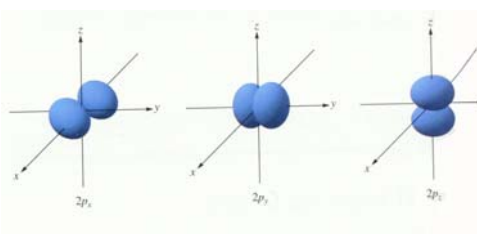
When Bohr devised his model of the atom, he based it on his observations of the bright line spectrum of hydrogen. The model fit his observations of hydrogen perfectly ... but hydrogen has only one electron. As soon as an element has more than one electron, Bohr's model no longer accounts for all the energies of light in the spectrum. Another model, the wave mechanical model does. The mathematics behind the wave mechanical model is complex, but the consequences are not difficult to follow. Like the Bohr model, the wave mechanical model of the atom has a dense, positively charged nucleus, and the electrons have distinct amounts of energy. There are differences as well. In the wave mechanical model, the electrons are not orbiting the nucleus in definite, fixed pathways. Instead, the electrons are in orbitals, regions in which the electrons of a particular energy is most likely to be located. They are still orbiting the nucleus, but not at fixed distances.



Spectrum of hydrogen



Spectrum of neon



These orbitals are shaped like dumbbells.

Answer the questions below based on the reading above, and on your knowledge of chemistry.

1. What is the main difference between the Bohr model and the wave mechanical model? _____

2. How are the Bohr model and the wave mechanical model similar? _____

3. Why did scientists develop the wave mechanical model? _____

4. In the Bohr model, what happens to the amount of room for electrons as you get further from the nucleus? What about in the wave mechanical model? _____

