

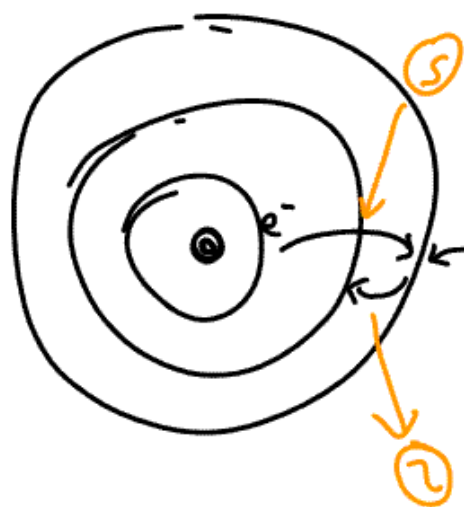
Physics 100 - Fall 2007 - Recitation 6

- ① Two jugglers toss batons back and forth.
How are they like a chemical bond?
Are they more like an ionic bond
or a covalent bond?
- ② A 142 gram baseball is thrown at 92 mph (41 m/s).
Suppose you measure the velocity of the baseball to
a precision of $.000000001 \text{ m/s} = 10^{-9} \text{ m/s}$, how
well could you measure the instantaneous position
of the baseball if you had an instrument able
to measure positions perfectly? (Assume the mass
of the baseball is exactly 142 grams.)

3

How well can you measure the speed of an electron in a hydrogen atom (in principle)?

Most excited STATE orbitals in an atom only exist for a very short time (known as the lifetime) before the STATE decays emitting a photon while the e^- jumps to a lower energy orbital.



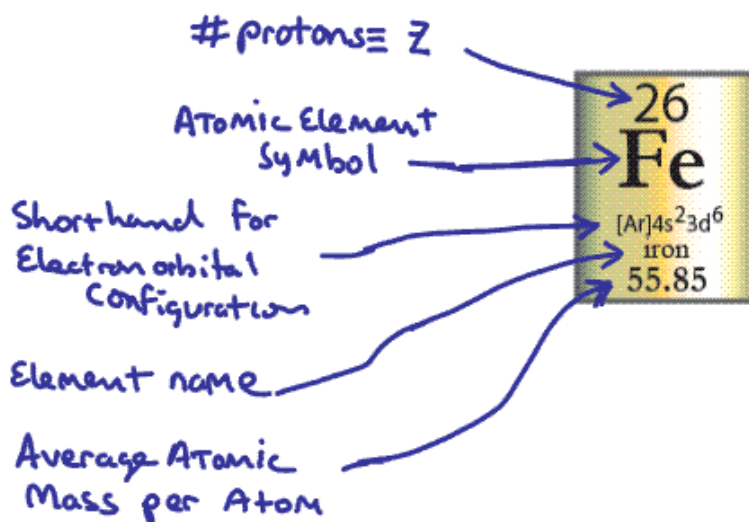
only here
for a
short time

What does

Heisenberg's uncertainty

Principle tell you this will
do to the color of the
emitted photon?

4



In a typical entry for each element of a periodic chart, you will see the various components above. Make sure you understand each of these things ... except for the electron configuration shorthand.

^{56}Fe has how many protons and how many neutrons?

How about ^{57}Fe ?

If the atomic mass is given in AMU (atomic mass units) and each nucleus is made of protons and neutrons (each of which add 1 AMU to the mass of the nucleus), how is it that iron can have the mass of 55.85 as shown above?

(15)

What was Rutherford's contribution to our modern concept of the atom?

Describe the experiments done in Rutherford's lab and what was learned from them.

Your TA will set up an "atom" for you to explore.

Your group will have a pile of " α -particle" ping pong balls

Use the ping pong balls to explore the nature of the "atom" before you. Can you determine what, if any, structures exist in your atom?