Re: Bohr's Atom still number one

Source: http://sci.tech−archive.net/Archive/sci.physics.relativity/2007−05/msg01167.html

- *From*: The_Man <me_so_horneeeee@xxxxxxxxx>
- *Date*: 7 May 2007 14:15:39 −0700

On May 5, 4:29 pm, bz <bz+...@xxxxxxxxxxxxxxxxxxxx> wrote:

> "g...@xxxxxxxxxxx" <g...@xxxxxxxxxxx> wrote
> innews:1178394138.430885.325220@xxxxxxxxxxxxxxxxxxxxxxxxxx:
>
> > On May 5, 10:41 am, bz <bz+...@xxxxxxxxxxxxxxxxxxx> wrote:
> > snip too long
>
> ....
>
> > > My main point is that the Bohr model predicts a
> > > rapid loss of energy with all electrons collapsing into the
> > > nucleus.
> > > Bohr could not explain why orbiting electrons would not
> > > radiate
> > > constantly.

Bohr could not (well) explain why electrons would not radiate. His best explanation was that the electrons were confined to "orbits" of soecific energy.

You suggest that electrons would collapse into the nucleus i the Bohr model. This is not accurate.

> > By radiate, you mean emit photons?
>
> Yes.
>
> > Why would they need to radiate

> under Bohrs?

> Because they are undergoing constant acceleration toward the nucleus, just as the earth undergoes constant acceleration toward the sun.

The collapse into the nucleus is the classical prediction. Since Bohr knew already that this didn't happen, he had to mddel WHY this doesn't happen. He had mostly ad hoc explanations

> And why collapse into the nucleus...since protons repulse them

> Protons repulse them????
> Unlike charges attract. Protons are positive. Electrons are negative.
>
> What do you think causes electrons to associate with protons anyway?

> and
> electrons have a high velocity?

> What makes you think they have a high velocity in the atom?

One can easily calculate the KE of an electron, and therefore its velocity. Core electrons travel at approximately c/ Z, where Z is the nuclear charge. When Z gets large, the speed of the electrons becomes sufficiently close to c, so that relativistic effects become very important.

> They don't in the modern atomic theory, but, you are correct when you think that, in Bohrs model, they will need to be traveling.
>
> They will need to be attracted to the nucleus. That attraction will 'push' them toward the nucleus. Only their speed keeps them from reaching it.

In fact, s electrons have a non−zero probability of being In the nucleus. Such is the basis of the hyperfine interaction.

> Electrons, when ever they travel at a high speed and their direction of travel is changed, radiate energy.

This is not true. The KE of a particle can be visualized by examining the wavefunction. Where the wavefunction is highly curved, the KE is high. Where the wavefunction is slowly chaning, the KE is low. Since the wavefunction for a 1s orbital is essentially exp(−r), the function is obviously more highly curved near the nucleus, than at infinity.

> ....

(energy = heat from reaction = photons)

Not all energy is manafest as photons.

> Correct, but they would know what happens to the photons(emitted or absorbed) from the total Energy of the reaction (before and after).

A chemical reaction may require energy of activation (to get the
reactants across an energy barrier.) It may absorb or give off heat,
depending on whether the products are in a lower energy state than the
reactants.

> Don't know my chemistry....say 2H+ + O− +
> E = H2O +....

No.

2H2 + O2 −−> 2 H2O + energy

Bravo..!

> They should know the total energy before
> and after of chemical
> reactions

Those can usually be predicted.

> (therefore the total photons produced or
> absorbed as well)?

> Whether or not photons are produced depends on the reaction
> conditions.
> For example, if the reaction takes place inside a fuel cell, the
> energy
> produced is in the form of electromotive force rather than
> photons.

Ok but that's not my point which is you said they weren't sure when the photons are emitted or instead absorbed...

I did NOT say 'they are not sure'.

I re−pasted your past answer below here:

You previously said:
****

> All we know for sure is that
> changes in energy state
> SOMETIMES are
> accompanied by emission of
> photons and that absorption

of a photon
results in changes in the
energy level(s).

****

There's a difference between SOMETIMES...and knowing exactly what occurs during a chemical reaction.

What makes you think I was talking about chemical reactions?

I was talking about Atoms OR Molecules in transition between two different states of excitement. Transitions are only associated with photon emission/absorbtion _some of the time_. NOT all the time.

My point being that you should NOT assume that photons are always emitted or absorbed because it is not true.

One could be ground state and the other could be a triplet state, for example. Or we could be talking about transition from an excited state to a triplet state.

Seehttp://en.wikipedia.org/wiki/Phosphorescence

....>> > The sun will also be affected and there will be a similar delay

before this occurs.

You may be right, but I recommend that you study physics, chemistry and math.

Master those subjects before you try the more challenging subjects like 'Elementry Omnipotence and Omniscience', the graduate courses in 'Godhood', and the PostDoctoral position of 'Master of the Universe'.

Your questions show that you are not doing your homework.

−−
bz

please pardon my infinite ignorance, the set−of−things−I−do−not−know is an infinite set.

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