Johann Marinsek 01.2017

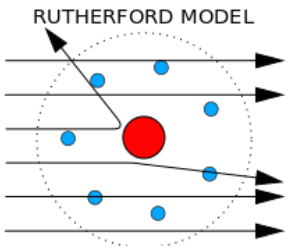
Electron orbitals imaginary

Rutherford's unrealistic interpretation of scattering results whereby atoms consist of nuclei surrounded by electrons in empty space

Observations did of electronic orbitals not succeed. If there are no extra nuclear electrons, then the standard atomic model is history.
Bonding and conducting electrons, neutrons, neutrinos, the periodic table according to fillings of atomic shells,... then are also history.
Hydrogen: An electron does not surround a proton but is coupled to it.
Atoms consist of coupled hydrogen's according to Prout.
Electrons are not bonding agents. Bonds are made of hydrogen.
Metals are massive lattices and not a set of nuclei plus whirling electron clouds.
Other articles of the author deal with the failures of Chadwick and Pauli in establishing neutrons and neutrinos and furthermore with the failure of Moseley in establishing numbers of electrons, neutrons and protons of atoms.
Work in progress!

Bohr atomic model on the test bench
The article deals with the question if extra nuclear electronic orbitals exist or not. It is easier to begin first of all with the alleged composition of atoms: Are there nuclei comprised of neutron and protons and extra nuclear electrons? Take for example C^{12} and its isotope C^{13}. Both possess 6 protons, 6 electrons and 6 neutrons; C^{13} possesses one neutron more in the nucleus.
Experiment: Direct a stream of protons towards the atoms. The atoms decay. Then count the number of the alleged constituents of the Bohr model. If the number of electrons is right, then it not definitive if the electrons are extra nuclear electrons or not. When the proton/neutron ratio not right, then the model is untenable. Where are the proposed experiments for all elements and their isotopes?
Regarding the birth of the Bohr model we must meticulously investigate the

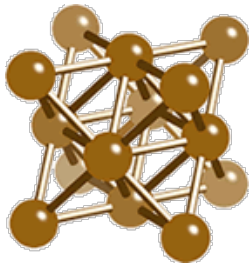
Geiger/Marsden/Rutherford scattering experiment where a metal foil gets bombarded with alpha particles. Rutherford's interpretation is not an empirical justification for the Bohr planetary atomic model where a nucleus is surrounded by extra nuclear electron shells.
In order to clarify the ontology of this model: Between the massive nucleus and the fictitious electron cloud (shown blue) resides nothing, i.e. there is vacuity.
Wikipedia (Geiger-Marsden experiment) explains:
When Geiger and Marsden shot alpha particles at their metal foils, they noticed only a tiny fraction of the alpha particles were deflected by more than 90°. Most just flew straight through the foil. This suggested that those tiny spheres of intense positive charge were separated by vast gulfs of empty space. Most particles passed through the empty space and experienced negligible deviation, while a handful struck the nuclei of the atoms and bounced right back;..



Rutherford... proposed a model where the atom consisted of mostly empty space, with all its positive charge concentrated in its center in a very tiny volume, surrounded by a cloud of electrons...

Rutherford developed a mathematical equation that modeled how the foil should scatter the alpha particles if all the positive charge and most of the atomic mass were concentrated in a single point at the center of an atom.

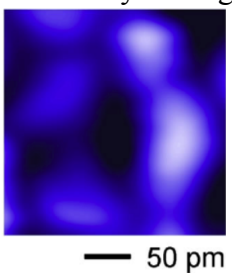
But this conclusion cannot be drawn from scattering and the scattering formula. One gets nearly the same results from the formula when we insert instead of the atomic number Z the mass of the metal atom divided by 2: $Z \sim A/2$. Later we will see that the crystal structure (bbc, fcc,...) must also be considered.



Alpha particles can pass between the bars or collide with lattice nodes. So it is not necessary to conceive atoms as consisting of nuclei and extra nuclear electrons.

Picture: http://www.marless.de/natur/st_bernsteen.htm

Can the Rutherford-Bohr atomic orbitals be confirmed by atomic force microscopy?
University of Augsburg physicists Giessibl, Hembacher and Mannhart [ghm]



"have imaged an individual tungsten atom by atomic force microscopy and found four distinct peaks that are attributed to highly located electron clouds. A printed image width of 5 cm corresponds to a magnification of two hundred million. A world-record resolution of 77 pm is demonstrated. The electron structure originates from the quantum-mechanical nature of tungsten bonding.
Tungsten develops a body centered cubic crystal structure such that every tungsten atom is surrounded by eight nearest neighbor atoms, causing "arms" of increased charge density that point to the next neighbors. Four of these highly localized electron clouds are visible on surface atoms."
Picture: http://www.sciencemag.org/sciencexpress/recent.shtml

By no means atoms with nuclei and surrounding electron clouds can be derived from force microscopy!
Scerri clarified the qualities of the experimental methods and what they measure:
"Atoms are not being observed directly" "since all that is measured by scanning tunneling microscopy (STM) and atomic force microscopy (AFM) is the flow of current across a tip, or the force that the tip exerts when passing across a surface."
"Also electron density is being indirectly observed…"
By no means one can "see" orbital structures directly. And it is undecidable whether the picture is from the orbital or from the surface of the nucleus or from both…
The interpretation of scattering experiments is now a decidedly different one:
Besides of the anteceding objections an alternative interpretation of the genesis of spectra is possible for an atomic model without extra nuclear electrons.

Orbitals are not observables

Recently Scerri [scea] focussed his view on the observability of atomic orbitals. In an article of *Nature,* Zuo et. al. [zuo] claim that they succeeded to observe orbitals.
Zuo et. al did research on this topic in 1999.
Why so late? The Bohr model with its extra nuclear electrons was created in 1913.
If physics is an experimental science, then the Bohr model had been an unfounded speculation for 86 years. The experimental foundation of the Bohr model had been for nearly a century

an indirect one. Electronic shells were hypothesized, quantum leaps of electrons between shells explained atomic spectra. This success repressed all doubts on the causality of this process... But the successful explanation of spectral lines due to quantum leaps cannot be considered an empirical validation of the leaps. Nobody observed them directly….

Orbiting electrons would crash into the nucleus! Fantastical explanation why they do not:
The electron is both, a particle and a wave. The wave is a standing one, therefore it is stable.
The essence of a wave is that something must be waving. What waves physically? Silence!
The origin of the so-called inertial forces that act on the electron was never elucidated.
The electron leap created a photon that was ejected. It is an energy lump E = hf, an impossible particle with frequency and spin...
So to this day the observability of orbitals must be questionable because there is no rationale for them.
Scerri [scea] analysed the claim of Zuo et. al. that orbitals can be confirmed by experiment. If it possible *to scan* an electronic structure, then one has to interpret visionarily this scan that it represents a complex orbital... First, this scan would not represent an orbital according to QM because QM is only able to calculate approximate solutions.
Even if we could observe an electronic landscape by scan, this is not an *experimentum crucis* for the existence of extra nuclear electrons. The origin of the scan can also be from electrons of compact atoms that possess electrons at the surface.
Further, the birth of photons remains obscure.
Conclusion: Scans by force microscopy don't confirm the Bohr model by experiment.

Metallic bonding according to QM untenable

In 1819 ***William Prout*** established the idea that every element consists of hydrogen atoms only. The atomic mass number A is identical with the number of hydrogen's.
Helium for instance consists of 4 H's. The H's are magnetically bound.
Every atom is an oscillator with specific Eigen frequencies.
Hydrogen consists of a proton and an electron. The proton is a composed particle.
All parts of the hydrogen atom can oscillate.

Because metallic atoms don't possess extra nuclear electrons,
electrons don't provide the glue holding solids together
Genuine metallic lattices consist of elastic rods made of hydrogen atoms.
Metallic bonding works in the following way:

1: Metals don't contain (valence) electron clouds.

2: The nodes of the lattice represent not positively charged nuclei, where the number of charge is Z (atomic number). Nodes are a construct of hydrogen atoms where rods are connected.

3: Since there are no free valence electrons available, electrons cannot be agents of metallic bonding. Metallic bonding is not due to forces between alleged free valence electrons and atom core ions. Genuine metallic lattices consist of elastic rods made of hydrogen atoms.
Rods consume some hydrogen atoms of the free metallic atoms, so the nodes do not contain the whole number of hydrogen atoms that the free metallic atoms contain.

4: Alpha particles of the Geiger/Marsden experiment collide with the nodes of the metallic lattic and are repelled. This works like collisions in macrophysics. Most Alphas pass unhindered the lattice. Some alphas bounce the lattice rods. A long-term experiment could show the destructior of the lattice.

5: Electrons are neither the agents for electrical and thermal conduction nor for specific heat. The existence of free electrons in metals is not proven experimentally.

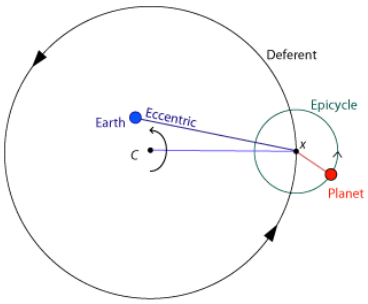
6: A crucial experiment that refutes current metallic bonding theory: Compare the bbc-metals Cr^{52} and V^{51}: Valence and unit cell parameters a_0 are comparable, so other properties should be in the same order of magnitude. But for example the E-module of Cr^{52} is more than two times greater than for V^{51}. Why?

In order to explain this with the current model the same used electromagnetic forces for Cr^{52} should be over two times greater than for V^{51}. This would be pure arbitrariness.
If we understand the metallic bonding result as real lattice, then it is possible that the weaker metal V^{51} possesses only one bonding lattice rod whereas the strong metal Cr^{52} possesses double rods. On the other hand it is surprising that the melting points are the same. Why? Melting begins with lattice rods. Two rods alongside melt together.

Crystal structure bcc	Bon-ding rods	a_0 [Å]	Valence	E -module GPa	Melting K	Electrical conduction 10^6 S/m
Cr-52	II	2.91	6	279	2180	8.74
V-51	I	3.03	5	128	2180	5.
Cr/V	2	0.96	1.2	2.2	1.0	1.75

The compact hydrogen: proton and electron coupled

In order to comprehend the realistic compact hydrogen model, I give here an outline of its essence:
Hydrogen consists of a proton and an electron. According to Rutherford and Bohr the electron orbits the proton. This electron is a so-called *s-electron*. Later the claim was that the s-electron does not orbit. Therefore it must perform an oscillation trough the proton. Difficult to image how the electron penetrates the charged quarks inside of the proton!
Evidently, there is no "picture" of the hydrogen orbital.
The fundamental question is:
Are proton and electron really separated or do electromagnetic forces couple them?



The Epicycle and Deferent and the Eccentric in Ptolemy's Model of Planetary Orbits

Atomic spectra: evidence for electron orbitals? No!

Recall the geocentric Ptolemaic model, it can explain the loops of planetary orbits. But only the Copernican model shows real kinematics. So, if a model can explain some phenomena, then the model does not have to be a realistic model. The same occurs for atomic models:

Recall the hydrogen atom. By means of the Bohr model and jumping electrons an explanation of the spectrum was possible. But this is an indirect observation by means of a non-causal process
Picture of Ptolemy's model: http://www.atnf.csiro.au/ I must ask for Credit: *R. Hollow* CSIRO
Robert.Hollow@csiro.au

What is the origin of the *Balmer* series when interpreted as frequencies?

The first term of a Balmer frequency is an Eigen frequency of H. Then there is a second frequenc term that produces a *difference frequency* with the H-Eigen frequency.
Now recall that the atomic oscillation does not take place in the vacuum. Every electromagnetic wave is a waving of something. It is the dielectric aether. The second frequency of the Balmer difference frequency represents Eigen frequencies of the aether.
So we can interpret all Rydberg-type frequencies formulas
$\nu = \nu_{Atom} \left| 1/n^2 - 1/(n+1)^2 \right|$ n = 1, 2, 3,…
as frequencies of a forced vibration of two coupled oscillators: the first term represents the Eigen frequencies of the excited specific atom. The second term represents the resonance frequencies of the transmitting EM medium. The difference frequency (the difference „tone") is the produced frequency of the EM transmitter that we observe as a spectral line.

Subharmonics of atomic oscillations

The relation $\nu \sim 1/n^2$ represent a type of subharmonics: 1/1, 1/4, 1/9, 1/16,…
We distinguish between subharmonics and superharmonics (or simply harmonics).
Harmonics are of type $\nu \sim n$: $\nu \sim 1, 2, 3,\ldots$
Now, the research of subharmonics should advance from merely knowing their existence to a causal understanding. The first insight is that subharmonic oscillations are due to nonlinear restoring forces. And, of course, subharmonics are related to the order of nonlinearity. Examples: coupling with spring represents linear coupling when the spring force is $F \sim r$ (r = distance).
The Coulomb force $F \sim 1/r^2$ is a nonlinear restoring force.
Hydrogen is an oscillator that is comprised of charged atomic subparticles. Coupling is due to electric and magnetic forces of the type $F \sim 1/r^2$. This is the reason for subharmonic oscillations.
The resulting difference „tones" that appear as Lyman-, Balmerseries etc. are indications for the existence of two coupled oscillators: The atomic oscillator and the dielectric cosmic aether.

Subharmonics in the voice of Freddy Mercury

Mercury produced subharmonics in his larynx: Not only the focal folds are vibrating but also tissue folds above the glottis. The frequency of the last ones is one third (= 1/3) compared with frequency of the focal folds. These coupled oscillation systems produced subharmonics.

Regarding the Lyman series
$\nu = \nu_{Atom} \left| 1/n^2 - 1/(n+1)^2 \right|$ where n = 1: $\nu = \nu_{Atom} \left| 1/1 - 1/4 \right|$
The frequency of the aether (= 1/4) is a fourth part of the hydrogen frequency (=1).

http://diepresse.com/home/science/4988338/Hart-am-Limit-der-menschlichen-Stimme

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Reductio ad absurdum:

Premiss: atoms possess orbitals.

Inference: desperate confusion, impossibility

First example:

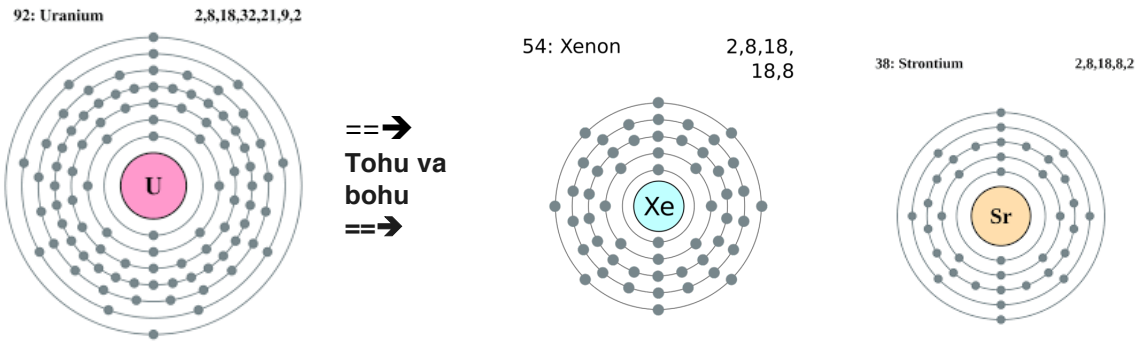
Abstruseness of the Bohr model: What is the cause for the 6 cm hydrogen radiation?

In terms of current theory a 6 cm radiation corresponds to a photon with a frequency of 5. 10^9 Hertz and an energy of 20.6 10^{-6} eV. To explain this tiny energy, physicists had to find out the corresponding quantum jump. The trial and error method showed that an electron must jump from the 139th to the 137th orbit in order to create a photon with 20.6 10^{-6} eV energy! [voigt]

(The formula for the energy is: 13.6 eV ($1/137^2 - 1/139^2$).
The radii of these orbits are huge. The formula for the radii is $r = n^2 r_1$, where r_1 is the Bohr radius 5.3 10^{-11} m. For n = 137 we obtain r = 9.9 10^{-7} m and for n = 139 , r = 10.2 10^{-7} m.
As a result the atom is inflated about 20 000 times!

Second example: Nuclear fission evidences the impossibility of orbitals

Take for example
$^{236}_{92}U^* \rightarrow {}^{140}_{54}Xe^* + {}^{94}_{38}Sr^* + 2n$, where U* means an unstable element.



Only God's invisible hands could operate the new locations of the electrons after splitting:
Uranium possesses 92 electrons that are skilfully arranged in shells or orbitals - whatever.
Then fission occurs, electrons crash chaotically into the daughter elements Xe and Sr.
Electrons are attracted by nuclei but they repel each other too. The result is a *tohuvabohuo*.
But things get worse: Every electron should know which is its target element, Xe or Sr.
Now, when all electrons are landed or are straying near the surface, the *aufbau* of electron shells or orbitals must begin.
If electrons perform their flight like a swarm of bees, then their brains must contain a software program...
If electrons occupy successively their provided locations, their „brains" must be able to solve the necessary trajectories...
Conclusion: This was a *reductio ad absurdum:* hypothesized orbitals get absurd.

Third example:

High-temperature fusion of elements cannot occur with electron shells

High temperature would destroy any structure of extra nuclear electrons.
As fusion of elements occurs, elements do not possess electronic shells or orbitals.

Scerri detects QM confusion

Eric Scerri's objections to QM [sce]:

Pauli's explanation for the closing of electron shells is rightly regarded as the high point (climax) in the old quantum theory. Many chemistry textbooks take Pauli's introduction of the fourth quantum number, later associated with spin angular momentum, as the foundation of the modern periodic table Combining this two-valued quantum number with the earlier three quantum numbers and the numeric relationships between them allow one to infer that successive electron shells should contain 2, 8, 18, c $2n^2$ electrons in general, where n denotes the shell number….

Pauli's additional postulate of a fourth quantum number, and the fact that no two electrons may share the same four quantum numbers (Pauli's exclusion principle).
However, Pauli's Nobel Prize-winning work did not provide a solution to the question which I shall call the "closing of the periods"—that is why the periods end, in the sense of achieving a full-shell configuration, at atomic numbers 2, 10, 18, 36, 54, and so forth.
This is a separate question from the
closing of the shells. For example, if the shells were to fill sequentially, Pauli's scheme would predict that the second period should end with element number 28 or nickel, which it, of course, does not. …
Therefore it implies that quantum mechanics cannot strictly predict where chemical properties recur in the periodic table…
The order of filling was obtained by reference to experimental facts, especially the spectroscopic characteristics of each of the elements (3).

To make matters worse, the Madelung rule shows as many as twenty exceptions, starting with the elements chromium and copper where, although the order of orbital filling is adhered to, the implicit notion that a subshell should be completely filled before proceeding to the next one is violated.
As is well known, chromium and copper have electronic configurations involving $4s^1$ configurations rather than the expected $4s^2$. Once again, the "correct" configuration is derived not from theory but by reference to the experimental facts.

Orbitals don't determine accurately the locations of elements in the periodic table

Another example of the claim that orbitals respectively their valence electrons determine the location of the element in the periodic table and its chemical affinity in the row in question:
B and Al are in a column one below the other. B and Al, both possess 3 valence electrons.
Chemical or physical affinity?
No! Al is a metal.
What is B? It is not a pure element but consists of ^{10}B and ^{11}B .
Same Z number 5 determines allegedly that the two boron's are isotopes of the element boron.
That is very questionable. Regarding spins, there is a big difference:
Whereas ^{11}B possesses spin 3/2 , ^{10}B has spin 6/2!
In the article *Synthesis of chemical elements* I proposed an improved periodic table.
Now Al belongs to metals.

^{11}B is considered as element Me of the metal group Be-Me-Al-Sc-Y-Lu and
^{10}B as the true element boron B of the group B-Si-Ge-In-Sn.
^{11}B is a light metal at the first place of the Be-Me-Al-Sc-Y-Lu group,
it should be referred to as Me for Mendelium in honour of Mendeleev

Periodic table revisited Genesis of periodicity: element formation due to successive increments of ^{4}He, ^{16}O, ^{12}C, ^{3}T, ^{2}D																	H
Bohr model and Moseley's law refuted. No atomic number Z that determines numbers of electrons, protons and neutrons																	D
		Be	⇨Be displaced, no longer an earth alkali metal ^{10}B is now the element boron ⇨										^{10}B			T	He
Li		Me	⇨ mendelium Me = ^{11}B, no longer a boron isotope but an element										C	N	O	F	Ne
Na	Mg	Al											Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	α Sn	Sb	Te	I	Xe
Cs	Ba	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn

Alternative atomic model:
Elements are characterized by

(1) atomic mass A (= number of constituent H's)
(2) the spatial aufbau (building) of the H's
(3) spins 0, ½ , 3/2, etc.

Quadrupole moments, electron affinity, electronegativity depend on the atomic structure.
Note that noble gases possess zero (0) quadrupole moments, electron affinities and electro negativities.

Periods due to spin conservation:

Atomic properties related to atomic structures

- **Spins**
  - **Rules for spin?**

Quoted are the most abundant isotopes. All elements or isotopes with odd mass numbers possess odd spins. Mass number A generally does not determine spin.
But there are groups where conservation of the spin state can be observed.
Most remarkable is the alkali group. Four members of the group (Li, Na, K, Rb) possess spin state 3/2. Why?
The composition of these elements can be described as:

^{7}Li (spin 3/2) "+" ^{16}O (spin 0) = ^{23}Na (spin 3/2)
^{23}Na (spin 3/2) "+" ^{16}O (spin 0) = ^{39}K (spin 3/2)
^{39}K (spin 3/2) "+" ^{16}O (spin 0) = ^{87}Rb (spin 3/2)

Examples for spin 0 conservation:

^{88}Sr (spin 0) "+" ^{16}O (spin 0) = ^{100}Mo (spin 0) Iwamura et. al. reported Sr → Mo!
^{108}Pd (spin 0) "+" ^{16}O (spin 0) = ^{124}Sn (spin 0)

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