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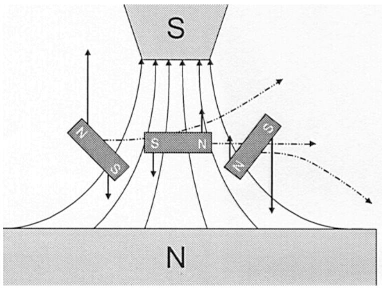
Contradicting results of Stern-Gerlach and Phipps-Taylor experiments prove that spins of the $5s^1$ silver electron and the $1s^1$ hydrogen electron cannot be the cause of atomic magnetic moments
Empirical verification of *a priori* identified values of total angular momenta due to orbital and spin motions of electrons missing
In atomic fusions magnetic moments are conserved
Prout's atomic model shows alternative magnetic moments
Existence of electron orbitals dubious

Abstract

Stern and Gerlach measured the magnetic moment of silver atoms that depends on the construction of the atom, which is according to Prout a composite of magnetic hydrogen atoms.
Magnetic moments are not due to fictitious angular momenta associated with orbital and spin motions of shell electrons. According to Russel and Saunders the alleged total angular momentum is J = L + S, where L are the momenta due to electron orbits and S are the electron spins.
The existence of electron orbitals cannot be verified by direct experiments.
Stern-Gerlach reported two deflected beams only. In order to explain this result, quantum mechanics (QM) suggested *a priori* that the outermost $5s^1$-electron of silver does not orbit the nucleus.
QM believed that for the Stern-Gerlach experiment for silver as well as for the Phipps-Taylor experiment for hydrogen the same physical premise exists, namely that only one non-orbiting electron causes the magnetic moment due to its spin.
So Phipps and Taylor expected for hydrogen the same result as for silver, namely two deflected beams. But for hydrogen they observed in addition an undeviated third beam that remained mysterious.
The contradicting outcomes of these experiments are not explainable in terms of QM, so the existence of orbitals does not become reliable.
Examples for unbelievable QM values for J: QM predicts for the two boron isotopes the total angular momentum value J = ½ like for hydrogen. If experiments yield different values for boron ^{10}B and ^{11}B, the Bohr model with its extra nuclear electron orbitals and nuclei that contain neutrons and protons is falsified.
QM predicts for oxygen ^{16}O the total angular momentum J = 2, therefore it should show a magnetic moment due to the two deflected beams in a Stern-Gerlach experiment.
But in terms of the Proutian atomic model there is a pairwise compensation of "up" and "down" magnetic moments of the 16 hydrogen's. Therefore the net magnetic moment is zero. For californium QM predicts J = 8 (!), whereas silver has only the value J = ½.
Stern-Gerlach experiments are necessary to decide on magnetic moments.
Interpretations of the Phipps-Taylor experiment: Hydrogen exists *ab initio* in the varieties ortho- and para-H <u>or</u> the inhomogeneous magnetic field divides o-H and reunites the fragments to p-H.
Deviated rays are due to o-H, undeviated rays are due to p-H.

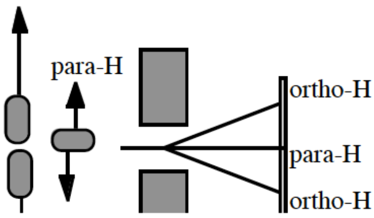
Quantized magnetic moments of atoms



The Stern-Gerlach experiment (SG) showed that silver atoms possess a magnetic dipole moment. No more!
There is no indication for electron orbitals.
But QM interpreted this outcome in terms of the Bohr model: 47 silver electrons surround the nucleus. 46 electrons are paired, so the magnetic moments of 23 electrons each cancel out with the magnetic moments of the other 23 electrons.
The QM claim is that the magnetic moment of the nucleus can be neglected because it is about a factor 1000 smaller.
So the net magnetic moment is allegedly due to the unpaired 47^{th} electron only.

In terms of QM this is the outermost $5s^1$ electron, an s-electron with l = 0. l = 0 means that this s-electron does not circle the nucleus. Also for the $1s^1$ hydrogen electron it was ordered that it does not orbit. Therefore the net magnetic moment for Ag and H is only due to the intrinsic magnetic moment of the fictitious spinning electron. It got the name spin and its relative value was fixed to be ½.
The claim that the $5s^1$ silver electron and the $1s^1$ hydrogen electron possess no angular momentum was ordered by Pauli in order to save phenomena:
The SG experiment for silver indicated two deflected rays only.
Therefore a Stern-Gerlach-type experiment for hydrogen should show only two deflected rays like for silver because hydrogen has only a single electron, but Pauli prohibited orbits.

Phipps-Taylor: magnetic moment of hydrogen



Phipps-Taylor performed this experiment for H. The results are: two deflected rays plus a central ray without deflection. This outcome made Pauli's cancellation of angular momentum of the s-electron pointless. Moreover, magnetic moments have obviously nothing to do with electron orbitals or, worse, their existence is dubious.
The not deflected ray of the experiment for hydrogen was due to something paramagnetic that nobody could explain.
Extra nuclear electrons cannot be confirmed by direct experiment.
If assumed, causal interpretations of phenomena are impossible.
If electron shells (orbitals) don't exist, then they cannot explain magnetic moments!

The alternative atomic model of Prout does not postulate the ontological division between nucleus and electron shells. According to Prout every atom is a composite of hydrogen atoms. So ^{109}Ag comprises 109 hydrogen atoms.
According to the present author every hydrogen atom possesses an intrinsic magnetic moment with the assigned **relative value 1**. "Up" and "down" magnetic moments cancel each other out, a net magnetic moment remains.
Take ^4He and ^{16}O for example:
Two, respective four pairs of anti-vectored magnetic moments cancel themselves out. Therefore ^4He and ^{16}O have zero magnetic moment.

QM determines a total angular momentum due to shell electrons, which are the cause for magnetic moments. Here is a short repetition of the doctrine of spin-orbit coupling according to *Russel and Saunders:*

Add the orbital angular momenta of the electrons to L.
Add spin angular momenta of the electrons to S.
Combine L + S = J, which is the total angular momentum.
This was done according to QM rules for all elements. The values were constructed a priori by Gedanken experiments without any experimental confirmation.
Total angular momentum J for oxygen was constructed this way to be J = 2:
Orbital angular momentum L = 1 plus spin angular momentum S = 1, so L + S = 2!

Conjecture: During atomic reactions magnetic moments $\mathcal{M}$ are conserved

SG experiment shows that atoms possess a magnetic moment or not. QM claims that this magnetic moment is due to orbiting and spinning electrons in the electron shell.
This interpretation is false!

Atomic magnetic moments are due to unpaired hydrogen constituents of the atom. An atom consists of hydrogen atoms, ^{4}He for example consists of 4 hydrogen's.
See the article *Synthesis of Chemical Elements by Helium and Oxygen Building Blocks* where I show the *aufbau* of the elements by electromagnetic coupling.
Regarding magnetic moments we don't possess the experimental values for all elements. But there are a lot of known atomic reactions where we can infer from the premise that magnetic moments remain conserved at the relative numeric value of the magnetic moment of an element.
Regarding the reaction **^{2}D + ^{3}T → ^{4}He + ^{1}H**
^{4}He consists of four hydrogen's, the net magnetic moment is zero. ^{2}D can be ortho-D or para-D, therefore the magnetic moment can be $\mathcal{M}$ =2 or $\mathcal{M}$ = 0. The magnetic moment of ^{1}H is $\mathcal{M}$ = 1, then magnetic moment conservation requires:
? + ? → 0 + 1.
If we try with $\mathcal{M}$ = 2 for ^{2}D, magnetic moment conservation is not possible.
So ^{2}D is a para-D with zero magnetic moment.
$\mathcal{M}$ is conserved for the reaction: 0 + 1 → 0 + 1. Therefore **$\mathcal{M}$ = 1 for ^{3}T.**
Further examples: **^{3}T + ^{4}He → ^{7}Li**, it follows: $\mathcal{M}$ = 1 for ^{7}Li.
Oxygen and sodium can be fused to potassium this way: **^{23}Na + ^{16}O → ^{39}K.**
^{16}O consists or four ^{4}He, therefore its magnetic moment is $\mathcal{M}$ = 0. Magnetic moments are conserved when for Na and K $\mathcal{M}$ = 1. (1 + 0 → 1)! All alkali metals have $\mathcal{M}$ = 1!
This assembling with oxygen does not alter the chemically active surface because oxygen increases only the inactive mass.

^{6}Li, ^{10}B, ^{11}B

^{6}Li is the source material for the industrial production of ^{3}T: **^{6}Li + ^{1}H → ^{3}T + ^{4}He**
When then the magnetic moment for T is $\mathcal{M}$ = 1, then due to the reaction
^{6}Li has magnetic moment $\mathcal{M}$ = 0.

Regarding the reaction **^{10}B + ^{1}H → ^{7}Li + ^{4}He,**
if we set $\mathcal{M}$= 1 for ^{7}Li, then necessarily **^{10}B** has magnetic moment $\mathcal{M}$ = 0. If it possesses only paired hydrogen's, no magnetic deviations occur in a Stern-Gerlach experiment.
In this case this isotope consists of 2 × **^{4}He** and one para-^{2}D.

^{11}**B**: Magnetic moment $\mathcal{M} = 1$. Because $^7Li + ^4He \rightarrow ^{11}B$
When there are two different magnetic moments for ^{11}**B** and ^{10}**B** then QM is falsified because QM predicts for boron with its two isotopes an unique total angular momentum J = ½ . Recall these remarks for the periodic table with included magnetic moments!

Note very well that not all configurations of atoms are stable. Oxygen is stable. The formula is ^{16}O, which means that the total number of hydrogen's (H's) is 16. ^{16}O consists of four ^4He. ^4He is two para- ^2D and has zero magnetic moment.

A He atom that would consist of two ortho- ^2D on top of each other is not very stable. Because this configuration is unstable, also two of them on top of each other are instable. This atom would be ^8Be that is unknown.
In any case experiments must determine the real magnetic moments.

I fixed the magnetic moment of ^1H to be $\mathcal{M} = 1$ in order to distinguish it from the not existing spin ½ of QM.

^{109}**Ag:** 108 magnetic moments of the 109 silver hydrogen atoms cancel out. According to the successive synthesis of the elements 108 hydrogen atoms represent 27 × ^4He building blocks. Result: ^{109}Ag has a magnetic moment $\mathcal{M}$ ="1" due to the one un-cancelled hydrogen.

^{107}**Ag** is a composition of 26×^4He's (26 × 4 = 104) plus one deuteron ^2D and one single hydrogen ^1H. If ^2D is para-^2D ($\mathcal{M} = 0$), $\mathcal{M} = 1$ for ^{107}Ag follows.

We can opt for $\mathcal{M}$ = 1 for all elements with odd mass number A
and $\mathcal{M}$ = 0 for all atoms with whole-number atomic mass A.
Then experiments decides if our assumptions are correct or not

Proutian atomic model: magnetic moments $\mathcal{M}$ due to atomic structure			
A = atomic mass, n = integer number	$\mathcal{M}$	**Collocation of ^1H**	**Examples**
A = n×^4He	**0**		**^4He, ^{12}C, ^{16}O, ^{20}Ne**
A = n×^4He + para-^2D	**0**	↑↓	**^6Li , ^{10}B, ^{22}Ne**
A = n×^4He + ^1H	**1**	→	**^{25}Mg, ^{65}Cu, ^{109}Ag, ^{37}Cl, ^{197}Au, ^{45}Sc, ^{89}Y,**
A = n×^4He + para-^2D + ^1H	**1**	→	**^{27}Al, ^{63}Cu, ^{35}Cl, ^{23}Na, ^{39}K, ^{87}Rb, ^{71}Br, ^{15}N, ^{31}P, ^{107}Ag**

The nature of neutrons, the nature of isobars

SG exp. was performed with a 50 to 50% isotope mix of ^{107}Ag and ^{109}Ag.
In the Bohr model the silver isotopes differ only regarding the number of <u>neutrons</u>, the orbitals are the same, so spins are the same, too.

According to Prout all atoms consist of hydrogen. Unstable neutrons are not components of atoms. During a decomposition of an atom, hydrogen's can be destabilized and reappear as decaying "neutrons". (See the article Neutrons are decaying excited hydrogen atoms)

<u>Isobars</u> contain the same number of hydrogen's but possess different architecture.
Due to different architectures, isobars exhibit different times of flight in mass spectrometry.
The mass of isobars conforms with mass number A.

Below, **periodic tables show periods due to element formation**.
Assumptions for magnetic moments :

$\mathcal{M}$ = 0 for whole-number atomic number A,

$\mathcal{M}$ = 1 for odd atomic number A.

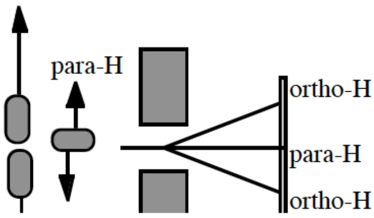
Examples: ^{7}Li + ^{16}O → ^{23}Na; ^{23}Na + ^{16}O → ^{39}K,
where oxygen is the building block that explains the periods…
Magnetic moments $\mathcal{M}$ are conserved : 1 + 0 = 1
<u>See the article Synthesis of Elements…</u>

Periodic table
Elements with assumed magnetic moments $\mathcal{M}$ Element building blocks D, C,

Legend: atomic magnetic moments $\mathcal{M}$ $\mathcal{M}$ = 0 or paramagnetic ⇳ Ortho- magnetic moment: $\mathcal{M}$= 1 = ⇧																	
^{1}H	1													^{1}H	1		
+ ^{2}D$\downarrow$	0													+^{2}D $\downarrow$	0		
^{3}T	1													^{3}T	1	^{3}T	1
+^{4}He $\downarrow$	0													+^{12}C$\downarrow$	0	+^{16}O$\downarrow$	0
^{7}Li	1	^{11}B	1											^{15}N	1	^{19}F	1
+^{16}O$\downarrow$	0	+^{16}O$\downarrow$	0											+ ^{16}O$\downarrow$	0	+^{16}O$\downarrow$	0
^{23}Na	1	^{27}Al	1											^{31}P	1	^{35}Cl ^{37}Cl	1 1
+^{16}O$\downarrow$	0																
^{39}K ^{41}K	1 1	^{45}Sc	1	^{51}V	1	^{55}Mn	1	^{59}Co	1	^{63}Cu ^{65}Cu	1 1	^{71}Ga ^{69}Ga	1 1	^{75}As	1	^{79}Br ^{81}Br	1 1
^{87}Rb ^{85}Rb	1 1	^{89}Y	1	^{93}Nb	1	^{97}Tc	1	^{101}Rh	1	^{107}Ag ^{109}Ag	1 1	^{115}In ^{113}In	1 1	^{123}Sb ^{121}Sb	1 1	^{127}I	1
^{133}Cs	1	^{173}Lu	1	^{183}Ta	1	^{187}Re	1	^{191}Ir	1	^{197}Au	1	^{203}Tl	1	^{207}Bi	1	^{211}At	1

Periodic table		*Elements with zero atomic magnetic moments ℳ*										*Building blocks: H, D, He, C,*					
		Legend: p-^{1}H = para-H; p-^{2}D… para –D														^{1}H	1
		Arrows → show increments with ^{4}He,														+^{1}H↓	1
		magnetic moments are conserved														+p-^{2}D↓	0
																+p-^{2}D↓	0
^{6}Li→	0											^{10}B→	0	^{14}N	0	^{4}He	0
												+p-^{2}D↓	0	+p-^{2}D↓	0	+^{16}O↓	0
^{12}C	0											^{12}C →	0	^{16}O→	0	^{20}Ne→	0
^{12}C ↓	0											+ ^{16}O↓	0	+^{16}O↓	0	+^{16}O↓	0
^{24}Mg→	0											^{28}Si→	0	^{32}S→	0	^{36}Ar→	0
+^{16}O↓	0																
^{40}Ca	0	^{48}Ti→	0	^{52}Cr→	0	^{56}Fe→	0	^{60}Ni→	0	^{64}Zn	0	^{76}Ge→	0	^{80}Se→	0	^{84}Kr→	0
^{88}Sr	0	^{96}Zr→	0	^{100}Mo→	0	^{104}Ru→	0	^{108}Pd→	0	^{112}Cd	0	^{124}Sn→	0	^{128}Te→	0	^{132}Xe	0
^{136}Ba	0	^{180}Hf	0	^{184}W→	0	^{188}Os→	0	^{192}Pt→	0	^{196}Hg	0	^{208}Pb	0	^{212}Po	0		

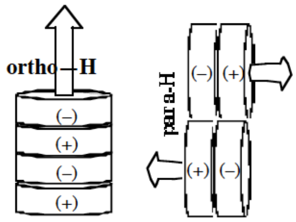
Phipps-Taylor: magnetic moment of hydrogen



In 1927 **Phipps and Taylor performed a Stern-Gerlach experiment for hydrogen** that refuted Pauli's *ad hoc* cancellation of angular momentum for s^{1}-electrons.
The experiment shows the existence of magnetic patterns of hydrogen.
Current theory claims that the Phipps-Taylor experiment showed the same effect as the SG experiment for silver, namely a split into two rays and that the observed two deflected rays demonstrate that the cause are the magnetic moments "up" or "down" position of the hydrogen electron.
If one reads the abstract of the Phipps-Taylor paper, it is true that in the magnetic field the ray was split up into two branching rays, yes. But this is only half the truth! The next sentence of the paper is: *There was also evidence of a central undeviated ray which is believed to be due to hydrogen active chemically but probably not as atomar H.*

Hydrogen not in the atomic state is for example diatomic hydrogen, ^{2}D. Is there the possibility to interpret the central not deflected ray due to a ^{2}D impurity?
Today two varieties of ^{2}D are known: ortho- ^{2}D and para-^{2}D. For para-^{2}D the magnetic moments cancel, thus the not deflected ray could be a para-^{2}D ray. Concerning the ortho-^{2}D, according to QM, its magnetic moment is twice as much as that of H.
Therefore a ray that consists of ^{2}D and H would be separated into 4 branching rays:
2 branching rays of ortho-H and 2 branching rays of ortho-^{2}D.
PT reported that the ray was separated only into 2 branching rays!
The authors declare: The peculiar character of the central line as described above, and our present conception of the hydrogen atom seem to preclude the possibility that is was caused by atomic hydrogen. Otherwise a deuterium impurity can exist only for a short time because hydrogen atoms merge extremely speedy into deuterium! PT could not explain their experimental result due to the atomic model of Bohr.

Interpretation of the Phipps-Taylor experiment



Here I try it to apprehend the enigma with the Proutian atomic model:
Are there two isomers of H, namely an o-H and a p-H? The p-H could explain the *central undeviated ray because it has zero magnetic moment.*
Two possibilities must be considered: Hydrogen exists *ab initio* in the varieties ortho- and para-H <u>or</u> the inhomogeneous magnetic field divides o-H and reunites
the fragments to p-H. Deviated rays are due to o-H, undeviated rays are due to p-H.
The picture shows o-H and p-H. Not to scale!
Regarding o-H, at the top is an electron (-), at the basis is a positron (+). Between electron and positron there is a <u>unknown number **n** of neutral</u> **positronium (Ps = e^+e^-)**
One single Ps is not stable but it can be bound in atoms.
Para-H is generated by an alteration of o-H. Two p-H's merge to p-D.

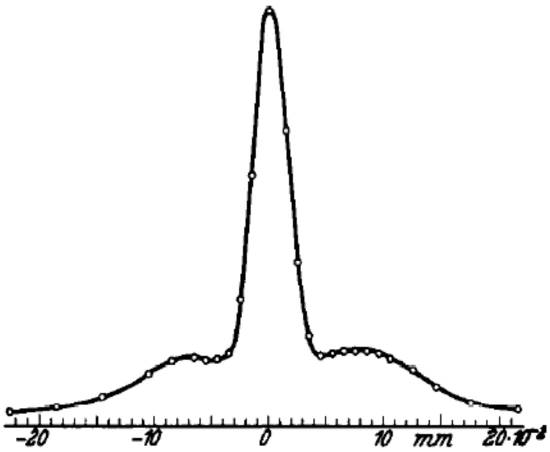
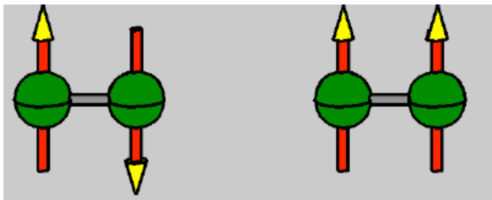


Fig. 12. Vollständiges Aufspaltungsbild von gewöhnlichem Wasserstoff bei 95⁰ abs.; die Unsymmetrie ist apparativ bedingt.

Stern-Gerlach for ^{2}D



The result shows a peak at zero deflection and two lateral maxima.
The peak can be interpreted as the effect of para-D because it has a paired antiparallel magnetic moment.

The "hills" left and right are due to the ortho-variety of H.

It is known that atomic hydrogen is not a fixed state but
two H's merge to deuterium. Deuterium possesses two isomers: para-D and ortho-D.
The ratio of ortho- to para- hydrogen is 3 : 1. Below -200 °C there exists almost exclusively para-hydrogen.
The ortho-D magnetic moment is either "up" or "down, therefore we observe two deflected rays. The central, undeviated beam represent para-D.

Stern-Gerlach experiment not crucial for the existence of orbiting and spinning electrons

The outcome of this experiment is only that atoms are little magnets or are composed of little magnets. These magnets can be either permanent (ring) magnets or minute solenoids; they must not be an effect of moving charges! Orbiting and spinning electrons are figments.

Pauli's exclusion principle and the H-atom

The climax of QM is the exclusion principle, which requires that no two electrons in the atom can have the same set of quantum numbers. Recall that the electron in Bohr's model of the H-atom has different orbits that depend on the energy of the electron. In the so-called ground state of the atom the principal quantum number n = 1 and the angular momentum of the orbiting electron is L= nh = 1h.

Quantization is due to the double nature of the electrons; it is allegedly a corpuscle and a wave. The claim is that the electron is also a standing wave, therefore n times wavelength must be the length of the circumference, n being an integer: $n\lambda = 2\pi r$. Again, in the ground state the electron is moving around the nucleus and has therefore angular momentum and angular magnetic moment.

In order to calculate the radius of the ground state, the so-called Bohr radius a_0, an orbiting electron with angular momentum must be presupposed.

According to Pauli's exclusion rules the s^1 electron in the ground state has zero angular momentum, which means that it does not surround the nucleus.

Therefore, Pauli

... did not consider electrons to be something real, as otherwise he could never have prescribed conditions where the electron can pass through the very centre, the nucleus, of the atoms billions of times every microsecond. Those zeros imply the possibility of oscillation of the electron right through the atomic nucleus. [Aspden1]

But an oscillation of the electron through the atomic nucleus is impossible, the electron demolishes the wonderfully structured orbitals of electrons and crashes into the proton, and this is the exit of the QM H-atom theory.

According to Schroedinger's opinion the electron is not a real thing but a thing 'as if', an auxiliary concept, which makes it possible to compose the equations for waves!

The electron and its movements are not real, they are only auxiliary things 'as if'.

Only waves have reality! Schroedinger assumes waves as constituents of the atom.

The question of what is waving cannot be answered by Schroedinger's theory. If the waves are made up of charges then accelerated charges produce radiation. Due to the energy loss the waves must crash into the nucleus.

The current opinion is that of Born, namely that there are no waves and that by the famous Schroedinger Ψ differential equation solely the probability amplitudes of the electrons are calculable.

QM is based on implausible *Gedanken experiments.*

Quantum mechanics pretend to be an empirical science where experiments and causal reasoning decides on approval. Surprisingly, this is not the case. Experimental validation of QM *a priori* electron angular momenta J, which allegedly cause magnetic moments $\mathcal{M}$ missing…

So one cannot be surprised about the desperation of a physicist:

Can anyone point me to a reference of where they do the stern-gerlach experiment for particles of spin>1/2.
I can't seem to find any. I find many discussing the theory, but none actually doing the experiment. I'm looking for experimental results.

http://physics.stackexchange.com/questions/281441/stern-gerlach-experiment-for-higher-spins

Only for a handful elements experiments were done!
The following table shows the suspect values, which are due to QM Gedanken experiments.

Experiment	Suspect values of total angular electron moments J due to QM Gedanken experiments. Experimental verification necessary. Source: CRC. Handbook for Chemistry and Physics, 74th ed. 1993/94								
Spin ½	J =½	J = 0	J = 2	J = 3/2	J = 4	J = 9/2	J =15/2	J = 8	J = 3
H, Li, Na, K, Al, Ag, Au	B	Be, Sr, Zn, Ge, Pd, Cd, W	O, Ti, Zr, Se, S,Te, Po	N, P, As, Sb, Bi,F, Br,I, At, Cl, Sc, V	Fe,Os Ni, Nd	Co, Ir, Rh	Tb, Ho,	Cf	Cr, Mo

Proposed crucial SG experiments:
1: Compare Co (allegedly J = 9/2) with Al (J = ½).
2: Execute experiments for the Boron isotopes!
3: Execute experiments for Cf with its huge magnetic moment.
4: Execute experiments for Be, show they zero J?
5: Remarkable is the QM desktop Gedanken value J = **2**
for the total **angular moment of oxygen**!
For the present author the magnetic moment of O is zero. Oxygen comprises 16 hydrogen's. Their magnetic moments cancel mutually.

History:
However, Stern was shocked by the iconoclastic atomic model of Niels Bohr. Shortly after it appeared in mid-1913, Stern and his colleague Max von Laue made an earnest vow: "If this nonsense of Bohr should in the end prove to be right, we will quit physics! (F. Hund, Geschichte der Quantentheorie, Bibliographisches Institut, Mannheim, (1975).)
But after the successful experiment: "Bohr is right after all."
(E. Segrè, Biogr. Mem. Natl. Acad. Sci. 43, 215 (1973).
With their single experiment Stern and Gerlach cannot confirm the existence of electron orbitals of the Bohr model!

Electron orbitals imaginary

Eric 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 2-dim 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 focused further his view on the observability of atomic orbitals.
In an article of *Nature,* Zuo et. al. 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 has been an unfounded speculation for 86 years. The experimental foundation of the Bohr model has been an indirect one for nearly a century.
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….

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 analyzed the claim of Zuo et. al. that orbitals can be confirmed by experiment.
If it is possible *to scan* an electronic structure, then one has to interpret visionary 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.

Periodic table:

The arrangement of the elements in the periodic table according to atomic number Z is baseless!

Does the atomic number Z determines the number of positrons, electrons and neutrons?
Let for example ^{107}Ag (Z = 47) collide with heavy atoms and hope to enumerate 47 protons and electrons plus 60 neutrons! If not, Bohr is falsified.

Then measure the kinetic energies of all constituent parts and compare with the Einstein formula for the bonding energy. Who did perform these crucial experiments?

Please see my articles where I show that the Bohr model together with the supplements of deBroglie, Chadwick, Moseley etc. is untenable.
If electron orbitals don't exist then the locations of elements in the periodic table according to orbital electrons are omitted…
The atom is a compact one. It is a structured composite of hydrogen atoms.

⇢ PS

Post Scriptum

Concerning magnetic moments due to orbiting and spinning electrons

Confused derivation of atomic magnetic dipole moments

The Bohr magneton is a phantom

Thesis:
Atomic electron orbitals are imaginary. There are no extra nuclear electrons.

Arguments:
A:
If electron orbitals are assumed, fission of atoms and formation of daughter elements are inexplicable. Example:
$n + {}^{235}_{92}U \rightarrow {}^{139}_{56}Ba + {}^{95}_{36}Kr + 2n$
What happens?
The orbital structure of the parent element crashes in the nucleus during fission. Each electron at this stage must possess a schedule that determines its future destination, i. e. firstly the destination for the right daughter element
and then the location thereabouts in one of the electron shells…
QM is not able to deliver causal arguments for this *aufbau* of orbitals. On this topic QM remains silent, QM came up to its dead end. *(reductio ad absurdum)*

B:
QM claims that the outermost electrons of the orbitals determine the location of the element in the periodic table. According to this rule B (^{10}B and ^{11}B) and Al are placed in the column IIIB: B, Al, Ga, In, Tl.
But Al is a metal and belongs to group IIIA: Al, Sc, Y,

^{10}B and ^{11}B are not isotopes of boron but are distinct elements:
^{11}B is a metal in group IIIB: ^{11}B, Al, Sc, Y.
^{10}B is similar to Si and belongs to group IVA: ^{10}B, C, Si, …

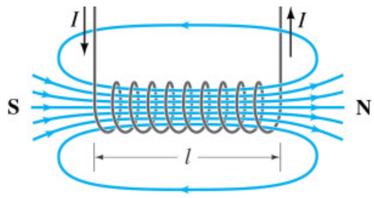
C:
Magnetic dipole moments of atoms
According to current theory certain spinning and orbiting electrons of the outermost shells determine a priori the magnetic moments. Magnetic moments are due to the total angular momentum J according to Russel and Saunders:
$J = L + S$, where L means angular momentum, S means spin of the electron.

There are dubious results for the relative values. For Ag, $J = ½$, for Cf , $J = 8$.
For ^{16}O, $J = 2$…
The present author is convinced that crucial Stern-Gerlach experiments will refute these relative values. All elements consist of hydrogen *(Prout),* oxygen comprises 16 hydrogen's, for example. For atoms with whole-numbered atomic mass the magnetic moment is zero, for odd mass numbers it is the same for all atoms.

When there are no extra nuclear electrons, then the Bohr magneton is pointless.

But QM supposes to possess a derivation for the Bohr magneton.
It is interesting to note the errors made:

Premises of the derivation
An electrical current in a solenoid (radius R) produces a magnetic field.
The magnetic moment is: μ = I NA, where I is the current, A is the area A = $r^2 \pi$, N is the number of coils. (graphs: wiki)
Regarding atoms, there are no electricity conducting wires.



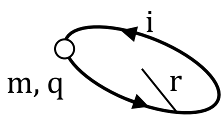
QM claims that without of an electricity conducting wire the allegedly orbiting electron of the hydrogen atom constitutes also an electric current I.
In a textbook [foe] one hopes to find a causal explanation that a single circling electron produces an electric current but there is only an assertion without substance:
"This does not only apply to "regular" current flowing in a wire, but in the extreme also to a *single electron circling around an atom*."
Therefore the orbiting electron allegedly causes a magnetic dipole moment μ.

This inference is not possible: One objection is that there are no conduction electrons in a metallic wire. An electrical current is the propagation of polarization state and not a flux of electrons. See the article *No Conduction Electrons*. Therefore, in a conducting circular loop there are no orbiting electrons.

That the orbiting charge ***e*** produces a current, and causes therefore a magnetic moment is not empirically confirmed.
QM derivation:
I = e/T, T…time of circulation , v =$2R\pi/T$; I = $ev/2R\pi$
Premise: magnet moment μ = I A, A = $R^2\pi$
→ $\mu = (ev/2R\pi)R^2\pi = (½)evR$

Erroneous premise: Conservation of angular momentum
$m_e\, v \times r$ = const = L → $v = L/ m_e r$
Error! Angular momentum is conserved only in macrophysics for low velocities.
In microphysics, v >>, and the electron crashes into the nucleus. There is no conservation of angular momentum because a dielectric aether decelerates the electron and the Coulomb force attracts it.

Continuation of QM: $\mu = (½)\, evR = (½)eRL/R\, m_e = (½)\,(e/m_e)L$



Quantized L according to Bohr: Without any rationale: L = $\hbar$,
so →
the **Bohr magneton** $\boldsymbol{\mu_B = (½)\,(e/m_e)\hbar}$, which is the fundamental unit for atomic magnetic dipole moments (but is a phantom).

The electron mass entered with the claim that in QM angular momentum conservation holds like in classical mechanics.

Now QM asserts that when the magnetic moment of the circling electron depends inversely proportional on mass, the magnetic moments of proton and neutron depends also inversely proportional on mass. Because masses of *n* and *p* are about 2000 times greater, their magnetic moments are negligible compared with the magnetic moment of the electron. This conclusion cannot be drawn.

In verity, there are sufficient arguments that extra nuclear electrons don't exist. The atom of Prout comprises only hydrogen atoms. Silver atoms possess one magnetically unpaired hydrogen atom that makes the atomic magnetic.
The Stern-Gerlach experiment shows this magnetic moment. This magnet is a permanent one.
The hydrogen constituents of an atom are probably not spinning ones.

Models of the electron are available. Now no decisive answer is possible.

QM is not causal and weird, uneasiness is noticeable when a textbook author means:
Bohr's model is a mixture of classical physics and quantum physics and far too simple to account for everything. It is thus small wonder that conclusions based on this model will not be valid in all situations.
In proper quantum mechanics (as in Bohr's semi classical model) L comes in discrete values only. In particular, the fundamental assumption of Bohr's model was
$L = n\hbar$ *, with* n *= quantum number = 1, 2, 3, 4, …*

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The two isotopes ^{39}K (93%) and ^{41}K (6,7%) were not tested separately!
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