

Wilmar Fuhse

# Fundamentals of Physics

A critical View on  
the basic Theories of Physics  
and a Description of a New Model

© Wilmar Fuhse 2014  
1<sup>st</sup> edition, printed by Isensee, Oldenburg  
ISBN 978-3-89134-000-4 Fuhse GmbH, Oldenburg

“The Germans are remarkable people; they can judge on a book, which they  
haven't read at all.”  
Lichtenberg

“When a physicist says: ‘due to reasons, which are not fully understood...’, he  
usually says: ‘We do not have the faintest idea, how this works’.”  
Wilmar Fuhse

**To my wife Annegret and my sons Lennart, Jan and Rasmus**

**I like to thank my friends for many fruitful discussions.**

**Wilmar Fuhse, Oldenburg 20<sup>th</sup> Jan. 2014**

The cover shows clouds over the Lake Garda. Clearly visible the parallel cracks in the ether. The picture was taken by the author.

# 1 Let's do a journey together

I want to invite you to a journey; there will be three parts. During the first trip we will accompany a single electron, while it approaches a single proton; we will see that this electron encounters a force; I call this force the “counter-compression” force on elementary particles, and - although unknown to today's physics - it is one of the most important forces in nature. We will ask ourselves, why physics community has forgotten this force, and we will find that physics had concentrated to attribute forces to the exchange of virtual particles; moreover, physics has the wrong view (please remember that the word “theory” comes from the Greek word “to see”) ...the wrong view of point-like particles, and there is no place for forces inside a particle. In our theory, there is place in the particles for forces and more.

During our journey, the electron will eventually meet the proton. We will see that we do not understand what is happening in detail, but we will be in the position to evaluate some of the processes, which take place during the collision, and how the electron is trapped in the electric field of the proton. We will find - based on the counter-compression force of the electron - a very simple formula for the light spectra of hydrogen; interestingly this formula is closely related to the old Bohr atomic model, but here, there is no circulating electron; instead the electron is stationary. This model also suggests how electron shells of other atoms are composed.

During the next phase of our journey we will see, how atoms or molecules interact; we will find that the kinetic gas theory of Boltzmann and others cannot explain the well-known shape of the Maxwellian velocity distribution. Here again, one of the most important effects in physics was forgotten by concentrating on point-like particles. This effect is related to the volume occupancy of low energy particles, but it is a more general effect, which also governs the atoms and molecules in solid bodies.

We will also look at the processes, which will eventually lead to the black body radiation. We will see that this radiation is still not understood, despite the effort of Planck and others. Planck had originally introduced on experimental grounds a term, which was related to Boltzmann's formula; but there are some slight differences, which were never really explained properly. In addition to that, Planck introduced a phase room, which is a rather spooky concept; thereby the room above the radiating surface is filled with light quanta (this is the real birth of quantum mechanics), which are spaced according to a special rule. The difference between Planck's term [61-66] and Boltzmann's formula was later well explained by Einstein [18], but he again had to use a spooky set of oscillators in the empty room above the radiating surface.

Here, we will try a different way; we will start at the energy distribution inside the radiating surface or the radiating gas, and we will find a set of radiation formulae, which are as well as Planck's formula [61-66] in agreement with the experimental results of Lummer et al.; in our formulae, the interaction between the atoms of the radiating surface and the radiation itself is left open; but we can show some formulae, which can serve to pinpoint the interaction. As we will see, there are presently no convincing theories for this interaction.

During this work, it became apparent that even Maxwell's velocity distribution needed some attention; the exponential decay, which is also known as Boltzmann-tail, was theoretically not explained, despite its simplicity. The real explanation will only show up later, when we introduce a new model of elementary particles.

In a different investigation, we will also look at the process, which takes place, when a light quantum is emitted from an excited electron inside an atom; we will find that this electron falls down towards the atomic nucleus with a speed, which is essentially lower than the speed of light. Interestingly, the speed is reduced by a factor, which closely resembles the Sommerfeld fine structure constant. This result can be explained by increased values of relative susceptibility and permeability, but it most importantly shows that physics - although there is some good agreement between radiation spectra and energy term schemes of quantum mechanics - is not in the position to explain the detailed processes, which take place during emission of light.

In the next phase of our journey, we will accompany a light quantum on its way through the universe. Today physics seems to be satisfied with the view that light generation and propagation are governed by the Maxwellian equations of electrodynamics. My view is different to this; although the Maxwellian equations may well be useful to understand how a light quantum is emitted in a certain direction, these equations cannot explain, why the quantum has a certain amount of energy and how this energy will be maintained; instead the Maxwellian equations suggest the energy of the quant to decrease in time like a water wave decreases in amplitude, while it spreads across the sea. Originally Hertz attempted to show that radio waves are similar to light waves and both are governed by the Maxwellian equations; today we know that radio waves are similarly quanta, and they also maintain their energy during the long journey in the universe.

There are many processes, which may affect a light quantum on its long path over hundreds of light years, while traversing the cosmos: today, it is generally accepted that neither electric nor magnetic fields have an influence on a propagating light quantum; the interaction with interstellar matter, such as atoms, atomic nuclei, free electrons or other particles, certainly have an effect, but these are not well metered. I have seen pictures of distant galaxies, where the polarisation of light was included; these pictures - in my view - do not show the polarisation of the emitted light, but they show the polarisation, which the light got during the intergalactic phase of its path. This process does not seem to be understood, and I think, it is hardly to understand as long as the intergalactic space is regarded as empty space.

We will particularly look at the interaction between light quanta and gravitation. The general effect of gravitation on light quanta seems to be well understood, and also the "effect of the expansion of the universe" seems well at hand. But when it comes to the details, the picture looks different. There are huge distances in the cosmos, which the light quanta transverse, and even small effects may sum up to drastic changes. Here we will show that gravitation has a minute, but - summed up over millions of years - a very important effect on the light quantum: while the quantum passes by the intergalactic matter, it attracts the matter by gravitation and thereby transfers energy to the attracted matter; this energy leads to an energy loss of the particle itself. I call this the aging effect of light. It may be related to the "tired light" hypothesis of Zwicky, who did not assign a reason to this, but he suggested that the Compton Effect had some influence on the light. Here we have a clear and quantitative reason for the aging process. In a first order approach my evaluation shows that the aging effect leads to an energy loss, which is well in line with the presently discussed red shift due to cosmic expansion. I conclude that at least a great part of the observed red shift is due to the aging effect and - if any at all - only a small amount of red shift may be attributed to a cosmic expansion. If the cosmic expansion is a real effect, it is quantitatively certainly less important; in conclusion, we

can say that the universe is much older and much larger than present theories say; my personal view is that the universe is stable; the big bang did not take place.

This result makes it necessary to step into the origin of Einstein's relativity theory; I thought about it for many years, and in the end I found a simple formula, which can prove easily, why Einstein went wrong: it is the twin paradoxon; it is usually said: according to the Lorentz transformation, a moving twin ages more quickly than his twin brother, who stays at rest. With this view, Einstein explained the shift of Mercury perihelion; later, the relative long life time of muons during their path in the atmosphere was explained by this effect; today, it is repeatedly reported that satellite clocks encounter different times than the same clocks on earth, and this is equally interpreted as a proof for the Lorentz transformation. All this is said to be based on the result of the experiment of Michelson and Morley. And it must be acknowledged that the theory of Lorentz is based on a constant and universal velocity of light in vacuum.

My view is the following: In the experiment of Michelson and Morley, we can identify two sets of twins: the one pair are the two different arms of the optical bench; these arms are aligned rectangular; the other pair of twins are the two parts of the light quantum, which follow the arms after a beam splitter and which eventually interfere in the eye of the observer. The essential thing is that all four twins meet at the same place at the same time.

Einstein's mistake was to assume that the Lorentz- Fitzgerald equations are valid independently of the others. After all - Lorentz had set up the equations to explain, why two observers have the same view on the Michelson experiment, even if one of them is moving. If we like, we can identify the four twins of the Michelson experiment with the four equations of Lorentz; all four twins in the Michelson experiment meet at the same place at the same time, and all four equations of Lorentz must apply simultaneously; they cannot be taken individually. Only in combination, they state that two observers see the four twins of the experiment to meet in the same place at the same time.

In conclusion, the said "proofs" for the time dilation formula of Lorentz are in fact real effects, which have nothing to do with the Lorentz- transformations; the time shift of the satellite clocks, the long life time of muons in the atmosphere and the shift of mercury perihelion are independent of the observers, they are real effect; there is presently no theory available, to explain, why these effects happen. The old explanation by means of the Lorentz transformations is wrong. These effects must be explained differently; in my view, the reason for these effects is a kinetic energy effect on the masses: by increasing the velocity, the masses are increased by a process, which is not yet known, and which will not be known as long as the elementary particles are considered to be mathematical points.

We still accompany the light quantum on the way through the universe. We have seen that the light quantum loses energy due to gravitation, and thereby it is aging. Recent observations by Perlmutter, Goldhaber [26] and Riss et al. [58], [59], [48] have shown that supernovae explosions seem to have a longer duration, when they are more distant. Perlmutter, Goldhaber and Riss et al interpreted these results in the sense of the big bang theory (the standard model in physics) as a further proof for the expansion of space. In my view, as the red shift of spectra is at least largely attributed to an aging effect of light, this observation of Perlmutter, Goldhaber and Riss et al can only mean that the light quanta are slowing down during in time. This is in contrast to the general view of a constant speed of light.

In the first order, we can say that light slows down with time, thereby maintaining its wave length.

The question is, if this effect of reduced speed of light quanta can be metered. With this question, we come to an end of our journey through the universe. Yes and No, we can meter this effect, but we must be very cautious about the experiment: in my view, the light quantum will encounter a dramatic change at the slightest interference with any matter. Thereby, an electromagnetic field builds up - according to the Maxwellian equations - and within this field, the light quantum reforms and finally leaves the spot of interference; we may equally say that the light quantum transfers its energy to the field and a new quantum will be born. I think that this sort of interaction happens already at the rim of our galaxy: I will show in a rather crude estimate that the presence of a single hydrogen atom or a single electron per cubic meter is sufficient to interfere with a light quantum and thereby extinguishes it and produces a new quantum, which has the same direction, the same energy, but it has a higher speed.

An experiment comes to mind, which was carried out by Bradley more than one hundred years ago. Bradley wanted to meter the aberration of light, meaning the shift of a seeming direction by the relative movement of the earth in the ether. He could meter this aberration, and the result was right in line with the ratio of speed of earth to the speed of light. So far, so good.

Airy wanted to see this more in detail and he pragmatically filled his telescope with water. He expected the aberration effect to be larger, because the speed of light in water is essentially lower than in air. Surprisingly, he did observe the same aberration effect as Bradley. Many theories were proposed to explain this result; even the great Thompson (Lord Kelvin) speculated that the earth would have a dragging effect on the ether. Eventually this experiment was equally interpreted as proof for the non- existence of the ether and as proof for the correctness of Einstein's relativity theory.

My view is that the light encountered some interference - at least - in the upper atmospheric regions; it happened already there that the light lost its original direction; instead the light quanta got a new direction, and from there on, the light behaved as if it was generated in the earth atmosphere. Bradley was just lucky, the aberration, which he thought was taking place in the telescope, had in fact already happened in the upper atmosphere. We all know, how strong this interference between light and atmosphere is, when we see a beautiful sun set with the sun disk distorted in many ways. This is an obvious event, which shows that light is heavily influenced by the atmosphere.

In any case, the metering of the speed of "old" light must take place outside the atmosphere; we have to ask ourselves, if this is enough; it might be that light passes our galaxy and thereby is interfering with matter; it would thereby loose the memory of the low speed; the light quantum would have reformed and was propagating with the well-known speed of fresh light in vacuum. The experiment may turn out to be a utopic enterprise. For me, it is enough to see from the observations of Perlmutter, Goldhaber [26] and Riss et al. [58], [59] that light from distant galaxies slows down on the intergalactic way to earth.

The aging effect of light is not an optional effect, which may be fed into the calculation "ad gusto", if it pleases the physicist; it is an effect, which takes place and which has to be taken into account.

Matthias Messer said to me one day: "Wilmar, if you want to be convincing, you must find an alternative reason for the cosmic back ground radiation". This in fact was one of the incentives for me to deal in detail with the Planck formula for black body

radiation. I found in a rather complicated calculation that the Planck formula stays the same in all respects, if the space is expanding as proposed by the big bang theory [69]: the "black body radiation" of the immense hot gas of an early universe could not be distinguished from the radiation of a rather cool gas today. But this result is based on the assumption that the heat radiation will encounter no other effect than the assumed cosmic expansion. This is not the case in reality; instead the heat radiation of the big bang would also have encountered the effect of aging by gravity; this aging effect would have had its effect on the radiation curve versus energy; the carefully observed spectrum of the background radiation of the COBE- satellites instead is in perfect agreement with the black body radiation with no aging effect at all [50]. Therefore I conclude that the cosmic background radiation stems from our direct vicinity (astronomically speaking) within the universe; I assume that our galaxy is surrounded by a halo of cold gas, and that is what generates the background radiation. It is an effect "on our doorsteps" and it is not an ancient event, which sends us the cosmic radiation.

During our journey through the universe, we discovered many things which lay dormant under the cover of the state of the art physics. We discovered a new force, the counter- compression force on elementary particles; we discovered that light ages and thereby loses not only energy but also its velocity; we have seen that the big bang must have happened much earlier than presently thought, if it happened at all; we have looked for the mysterious oscillators in the radiation field above a black body radiator, and we found that there are other ways and more rational to explain the black body spectrum; we have seen that the Maxwellian velocity distribution cannot be explained by Boltzmann's kinetic molecule model, and we have seen that there must be an effect of low energy particles inside a gas, which was not identified properly.

Many of these discoveries were made, because we have seen the atoms and elementary particles as extended bodies, with a dimension essentially given by a single "de Broglie"- wave length. The state of the art physics sees the elementary particles as point- like bodies, and thereby it does e.g. make no sense to ask for a compression force on this body; a point- like body cannot be compressed and therefore can withstand any external force without changing its energy. This may be one of the big differences between my view of nature and the general view.

From this "point of view" I will present a new model on elementary particles. An essential part within this model plays the ether, which originally was set up as a medium, transferring the light waves. This concept of the ether is as old as the discovery of Roemer that light has a final speed. Before that it was generally assumed that light acts instantly, so we see things in the same moment, as they happen, even if this event is light years away from us. But there were many speculations about this ether, which may have led into wrong directions. People had difficulties with this medium after it became "transparent" from the experiments of Hertz that light is a transversal wave and not a longitudinal wave. Ironically, the interpretation of the light electric experiment by Einstein should have shown that light has a different quantity, because the experiment had shown that the light quanta maintain their energy and do not decay as predicted by the Maxwellian equations. Instead of pursuing this line, Einstein concentrated on the Maxwellian equations and showed that these are invariant to the Lorentz-transformations. This was a giant task, and he expected to win the Nobel award with this work, but he was awarded the Nobel Prize for his interpretation on the light electric effect.

In my view, there was no direct conflict between Michelson's experiment and the concept of ether. The difference to other views was that I specifically allowed the ether to have strange properties, whereas the state of the art physics made certain naive assumptions on the properties of the ether. By proving that these properties lead to conflicts with experiments such as the one of Michelson and Morley, the whole concept of the ether was dismissed; instead the state of the art physics concentrates on fields and point like bodies in an otherwise empty universe.

In this new model, the ether is quite a different material. I realized that the ether cannot be a homogeneous medium, which just compresses and expands as an elastic material like rubber; instead the ether must be able to form cracks and cavities (this – I think – is the real new aspect of the ether, as I see it). These cavities stand for the physical masses and for the energy contents e.g. of electric and magnetic fields. The essential concept is that forces acting on the ether form a pattern of cracks, which - like the cracks in a glacier - have a rectangular pattern. Thereby the ether forms rectangular bricks or cubes; therefore I call this model the ether cube model. The way, the pressure zones and the ether material interact with each other and with the cavities, which form inside the ether, is an essential item of the model. I thereby can model electric fields and magnetic fields in a classical way; inside the elementary particles, there exist distortion zones, where the ether cubes turn and twist; this stands for the spin and angular momenta of elementary particles.

One of the most important quantities in physics is the spin of an elementary particle. In the state of the art physics, the spin is a mysterious quantity; in our new model, the spin is something real, it can be calculated how it contributes to the interaction of particles.

The model must make the difference between free elementary particles and bound particles, such as the electrons, which are trapped inside the electric field of the positive nucleus [71]. The model provides some means to deduce from the free particle to the bound particle; interesting conclusions can be drawn.

The model may have many speculative elements; a model is already useful, when it makes the understanding of a particular process easier; it is not forbidden to set up a physical model, which does not in all respects reflect the reality. But when it comes to the keyword "ether" the physics community behaves like the devil in front of a bottle of holy water. With this keyword, physics does not any longer seem a science; it reacts like a religion, and the members of the physics community behave like monks in a monastery, constantly repeating the credos "there is no ether...".

This model has certainly its merits in easing the understanding of spin and other essential things of elementary particle physics. In the end, we can show how high energy elementary particles interact, we can assign quarks and gluons to the ether cube model, and it can help us to understand how real and virtual elementary particles interact.

We also try to identify in the model what the gravitation is: there are two alternatives: the first one is the modelling by small vibrations of the cavities in the ether; the attraction of these cavities then takes place much in the same way as a cavitation bubble in water is attracted towards its mirror bubble near the propeller blade. The second one is the possibility of small cracks around the elementary particles, thereby filling the gravitational field with virtual particles such as gravitinos. I speculated that the interference of these cracks will eventually lead to an attracting force. But as the gravitational field - in contrast to electromagnetic fields - has no energy density distribution, this concept was dismissed in favour of the vibrational model. A more



detailed look at the model shows that this was not a justified conclusion. We will see that the model contains a surprising answer to the question, what the nature of gravitation might be.

Although the ether is very hard, it may be compressible to a very small extent. This would mean in our modelling that the gravitational fields do only have a limited extent. That is in fact, what seemed realistic to me; there are many galaxies, where the shape of them cannot be understood, if the gravitation would reach up to infinity. These galaxies speak in a lively way that gravitation is a limited effect; I assume that the gravitation of our solar system does not extend onto the next fixed stars. The shape even of spiral galaxies cannot be governed by gravity; instead the Milky Way is floating in the turbulent ether, and this determines the shape of the galaxy.

In a final part of this book, I show how this model fits into a more global view of the universe. The universe is not homogeneous, as the old ether theories suggested; The universe is turbulent with giant turbulence zone of many hundred light years in dimensions; turbulence balls and vortex rings are the dominant large scale structures, and matter was generated and is presently still generated at the main interference areas of the turbulent zones. These key elements of turbulent balls, vortex rings and cracks in the ether also appear in smaller scales; we can see in meteorology many items, which cannot be explained by classical physics; e.g. the jet streams of the "weather machine" may be caused by cracks in the ether, and this may explain the rectangular pattern of the jets, when they zigzag around the earth.

"Bon voyage." "Gute Reise." "Have a nice trip."