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The Jetstream of Black Holes – Gravitation as Electromagnetic Phenomenon

G. Helmecke[1] and **U. Herkenrath**[2]

[1]*Facharzt fuer Innere Medizin, Erfurtstr. 33, D-53757 St. Augustin, Germany*
[2]*Faculty of Mathematics, University of Duisburg-Essen, Hans-Weber-Str. 1, D-53773 Hennef, Germany*

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***Corresponding author:**
G. Helmecke
Facharzt fuer Innere Medizin
Erfurtstr. 33, D-53757 St. Augustin
Germany
E-mail: dok-helmecke@t-online.de

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Abstract

Recent observations of jetstreams generated by black holes claim modifications of previous explanations for that phenomenon, as is described in the literature. We are able to provide appropriate modifications by exploiting our results published in previous papers. Moreover, those recent observations on jetstreams confirm our models and theories concerning the structure of atoms, the explanation of gravitation as electromagnetic phenomenon and the structure of the universe. We think that our models and theories do not contradict the ones of established physics, but enrich them with new additional aspects: The existing laws of physics are not attacked or suspended. Merely some further interactions of matter can be explained and gaps in certain derivations can be closed at least theoretically by our ideas. They need however further additional confirmation by physical research. We start with the structure of atoms and proceed to the explanation of gravitation. The synopsis of both theories in turn leads to the properties of jetstreams discovered recently: They arise at the accretion disc of the black hole and must necessarily consist essentially of protons according to our previous results. Moreover we can explain that not all elementary particles are absorbed by the black hole. Behaviour respectively properties of black holes go with our ideas on the structure of the universe.

Keywords: Jetstreams, Black holes, Universe, Shape of the Universe, Gravitation

PACS 04. 70. -s – Physics of black holes

PACS 04. 50. Kd – Modified theories of gravity

PACS 14. 20. D – Protons and neutrons

1. Structural Properties of the Atom

Our considerations on the atomic model arise from two facts: First, the strength of the nuclear power induces that the neutrons constitute a strongly cementing substance between the protons. Second, we take into account the behaviour of rotating electric charges, as it may be observed on a globe lightning.

The way of a globe lightning to the earth does not obey the classical mode of discharge. Even when hitting the earth there is no immediate discharge due to the rotation of the electrical energy. Our new atomic model results from the behaviour of rotating electric charges in combination with modeling matter as wave respectively wave packages according to De Broglie. Therefore we model the elementary particles of the atom, i.e. proton, neutron and electron in the following manner.

The proton is a ring: On its outside (with respect to its radius) there are positive waves in form of quadrated sinusoidal waves. The ring represents the area, in which the

positive charge of the proton rotates. The positivity of the charge is characterized by the direction of rotation, e. g. clockwise. A radial section through the middle of the ring, i.e. a section parallel to its supporting surface, divides the ring into two parts of equal height. The contour plot of the section is shown in Picture 1A.

The electron is modeled in the same manner with the only difference that its direction of rotation is opposite to the one of the proton because of the negativity of its charge, e. g. counter clockwise (see Picture 1A).

The neutron is modeled analogously as ring with the positive waves on its inner side. Since protons and neutrons are strongly connected with each other, the sign of the charge of a neutron should be negative. However, its negative charge cannot be measured outside of the ring, since the outside of the ring is "smooth". A radial section generates the contour plot shown in Picture 1B.

The coupling between proton and neutron is achieved, when the amplitude height of the proton's wave package penetrates the neutron's ring. That is nothing else than a system of a hook-and-loop fastener. Since that does not constitute a classical electromagnetic coupling, stronger powers of attraction take effect. That explains the enormous strength of the nuclear forces. Of course, stability of such a system of protons and neutrons requires certain special levels of energy.

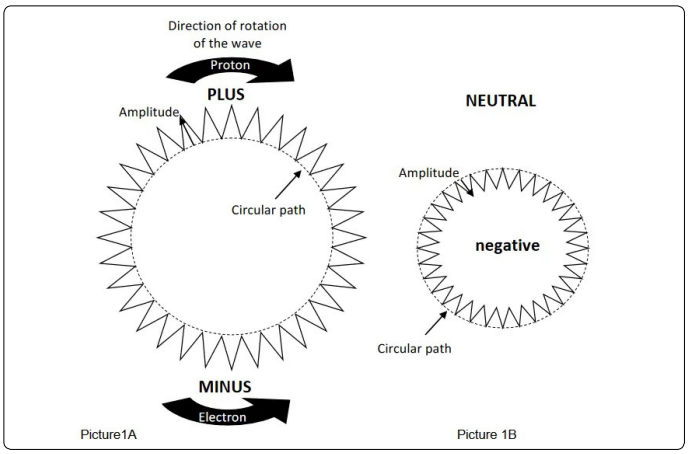

Figure 1A. Direction of rotation of the wave
Figure 1B. Amplitude inside the rotation circle

According to our model the elementary particles of the atom have a uniform structural design. We regard protons, neutrons and electrons as the elementary particles of the atom. That means: If they are broken down, there arise even smaller particles. But the elementary particles mentioned above cannot be built by "welding together" those particles. The smaller particles are nothing else than fragments or ruins of the so-called elementary particles.

If an elementary particle is broken down, the structure of its wave package is broken and collapses. If the structure of an atom is broken, the interaction of its elementary particles and therefore of its rotating wave packages is disturbed, the waves collapse. As for further consequences of our modelling we refer to our article [1].

2. Gravitation as Electromagnetic Interaction

Explanatory statement of our approach: Our aim is to design a model in the sense of a scientific hypothesis in which the gravitational force is explained as an electromagnetic effect. Since mass is equivalent to energy, it seems to be natural that gravitation does not play an exceptional role in the series of basic physical forces or interactions, but is integrated into the electromagnetic character of the other physical forces. We think that general experience in physics recommends to try to explain phenomena with as few causes as possible.

Another remarkable effect is that the law of gravitation has the same structure as Coulomb`s law for the interaction between electric charges at rest: The force of attraction respectively repulsion (according to the signs of the charges) is proportional to the product of the magnitude of the charges and inversely proportional to the square of the distance between them, see e. g. [2, p. 7] Moreover, down to distances less than 10^{-12} m, no quantum modifications of the electromagnetic forces have to be taken into account according to [2, p.3]. Considering the size of an atom on the scale of 10^{-10} m and the fact that electromagnetic forces are the only essential forces which act on electrons according to Wichmann [3, p.34 resp. 45] the impact and importance of electromagnetic forces on atoms and any agglomeration of matter and its conditions are clear.

Our explanation of gravitation as electromagnetic interaction fits to the fact that gravitation may appear as a repulsive force under certain circumstances, see e.g. [4].

The electromagnetic structure of atoms: The origin of gravitation: The key to our explanation of gravitation as electromagnetic interaction is that an atom is not completely neutral in the sense of electric charges. This effect is caused

(1). by a certain kind of synchronization of the atom and

(2). since the hull of electrons is a rotating system of charges like e. g. a globe lightning.

These two principles rule the interplay between positive and negative charges of an atom in itself (1) and between neighbouring atoms (2).

Our hypothesis of the synchronization of the atom means that the distribution of protons in the nucleus corresponds to the hull of electrons in such a way that a part of positive radiation of the nucleus, i.e. the protons, overcomes the hull of electrons, since the position of protons in the nucleus relates to points in the hull of electrons, for which the intensity function is near to zero. The intensity function is the density of the sojourn probability, here the one of an electron or some electrons.

Therefore an atom is a "synchronized" system, as the interplay between protons and electrons is organized in such a way that the collection of all electrons does not interfere with the collection of all protons so as to neutralize the positive charge of the nucleus as a whole.

The size or the power of the excess of positive radiation of the nucleus depends on

- the number of protons, neutrons and electrons,
- the distribution of the electrons over the different orbits of electrons,

and of course on conditions of the neighbourhood of the atom under consideration.

The electromagnetic interaction between atoms: On basics of the electromagnetic structure of a single atom there result the consequences for the interaction of two neighbouring atoms A and B.

Because of the synchronization of the atom and the rotation of the electrons the hull of electrons represents something similar as a semi-permeable membrane for positive charges. The hull lets escape an essential part of the positive charge of its own nucleus, but shields its own nucleus against positive radiation of neighbouring atoms. What about the balance of the electromagnetic forces between two neighbouring atoms A and B?

First, there is the sum $\sum^a$ of attracting electromagnetic forces between the nucleus of A and the hull of electrons of B and symmetrically between the nucleus of B and the hull of A:

$$\Sigma^a = F^{\mathrm{a}}{}_{nA,eB} + F^{\mathrm{a}}{}_{nB,eA}\Sigma^a$$

Next, there is the sum $\sum^r$ of repulsive electromagnetic forces between the both hulls of electrons and the both nuclei:

$$\Sigma^r = F^{r}{}_{eA,eB} + F^{\mathrm{r}}{}_{nA,nB}$$

As is explained in our article [5] in detail, it holds true:

$$\sum^a > \sum^r$$

The positive difference

$$F_{g,A,B} = \sum^a - \sum^r$$

is the attracting gravitational force between the atoms A and B. For the special case of two hydrogen atoms detailed calculations are provided in [6].

There even remains an excess of positive radiation generated by the two neighbouring atoms, which looks towards the hulls of electrons of other neighbouring atoms. Because of such an interplay of positive and negative radiation atoms may agglomerate to a physical body with an excess of positive radiation. That is effective even outside of the body and explains gravitation.

3. The Jetstream

In 1954 Baade and Minkowski introduced the term "jet" on the occasion of observing a radio galaxy. Jets are focussed outflows of matter out of cosmic objects on a large length scale. According to [7] they are the biggest particle accelerators of the universe.

In the last 15 years several astronomers observed and investigated in particular jetstreams, which are generated by quickly rotating supermassive black holes. By means of a refined combination of radio telescopes installed on earth and a radio satellite (started in 2011 by the Russians) one managed to construct a telescope with the highest angular resolution until now, the so-called RadioAstron. According to [8] the astronomers Giovannini and Savolainen succeeded to trace back the structure of a jet up to 12 light days from its origin. This jet is generated by a black hole with a mass of 2 milliards solar masses. The measurements indicate that the models so far for the formation of a jetstream have to be revised.

According to the new measurements from the year 2018 the jets go out from the accretion disc of the black hole and not from its ergosphere as conjectured previously. Due to our atomic model shown in Section 1 we are in a position to explain this new observed effect.

At the accretion disc all the matter attracted by the black hole gathers on spiral-shaped paths. Part of the matter falls down into the black hole on a steep spiral path. Thereby the basic structure of that matter – the rotating waves according to [1] – is broken up so quickly that no jetstream is initiated. On the wider spiral-shaped paths part of the matter reaches a position, where gravitation exceeds nuclear force, but matter is able to react. Thereby the structure of the atoms is destroyed, that means the elementary particles are separated. According to Section 2 the black hole as a huge mass-attractor has an enormous positive emission of radiation. Therefore the positively charged elementary particles, the protons, are ejected in the jet. The negatively charged electrons and the neutrons, which are neutral towards outside, are absorbed by the black hole. Whether the ejected protons in the jetstream retain their basic structure, is open. The jetstream entrains matter which crosses its path. That in turn will induce electric charge, too.

One has to assume that in a black hole the three-dimensional structure of matter is completely dissolved, therefore the structure of rotating waves, too. How the energy of negatively charged particles pulled-in induces a reinforcement of the positive gravitational field, cannot be explained now. Up to now one only can state that an interaction happens which generates attributes of a positively charged field.

4. Conclusions on Cosmic Basic Structures

The synopsis of our papers [1,5,9] enables not only additional insights in the events around black holes and the phenomena generated by them, but also confirms our theories. Already in our work on the basic cosmos-model [9] we assume that the universe is higher-dimensional than the four-dimensional space-time, i.e. the latter one is embedded in that higher-dimensional structure. A first consequence is that the intellectual vexation of the "singularity" of a black hole is dissolved. Most astrophysicists claim a point in the four-dimensional space-time to which the black hole should reduce, an imagination which is empirically and theoretically nonsensical. That point is "something" in the embracing higher-dimensional structure. This structure escapes our horizon of observation, but not natural reality with its range of interaction

According to the so-called evolutionary causality scale, introduced in [9], an event in a higher-dimensional space may happen out of time, but nevertheless interact with our conventional spacetime structure. In this case we are in a position to bring it into line with time, although it has originated independently of time. Here we think of the phenomenon of entanglement in quantum physics, see [10, p. 77], e.g. A further consequence of those insights is: A dimension independent of time may remain in force timeless, i.e. forever.

The physical events in the range of black holes may be explained by the atomic waves theory, but it does not mean that we discern the structures of the higher dimensions at the moment.

We mention that a stable orbit around a black hole is impossible because of its continuous mass gain. It seems clear that the black holes of the galaxies prevent a fall-back of matter to a "new singularity" in this actual space-time structure, since a complete dissolution of the space-time structure is conceivable and possible. Whether the black holes communicate in the higher-dimensional structure or lead to new local "big-bangs" according to[11], is open at the moment.

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