

About the utilization of the invisible Energy of the Universe to act as a free and inexhaustible Source of Energy

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Only a few years ago, the facts described in this article, would have been regarded as impossible or perhaps as fantasy. In all probability, people may have smiled at the rotor presented here and most likely considered it to be a “perpetual motion machine”, because in reality, such a machine cannot exist, as everybody knows.

Of course the long accepted view that a “perpetual motion machine” cannot exist is unchanged today and probably will remain unchanged forever. Nevertheless the article describes a rotor that can rotate endlessly, without being supported by any visible source of energy.

The remarkable characteristic of this rotor is, that it is driven by a source of energy, which mankind, until a few years ago, had no prior knowledge. This novel type of energy source is now described here.

But how do we give definition to or imagine this type of energy source ? What could it be ?

In order to answer these questions, we go back to the discovery of this energy source, which was achieved in the recent past. In the field of physical cosmology it was observed, that two-thirds of the total universe comprised of an invisible type of energy, about which, mankind [nowadays] knows only slightly more, than the fact that it exists. As we cannot see this type of energy, it was given the name “dark energy”. This name does not intend to impart any connotation with “dark” or “miraculous paranormal” forces, but it simply points out, that we cannot see this energy – just like we cannot see anything if it is dark. The name shall also indicate, that we have little knowledge of its nature or origin. In order to avoid misunderstanding, this energy is sometimes referred to as “space energy” or “vacuum energy”, because it is a property of mere space, and thus vacuum. This does not however, indicate the necessity to produce a good vacuum in order to establish this energy. Things are rather like that: Space contains this energy, independently whether it contains any visible matter or not. Another portion of this energy is “quantum mechanical zero point energy” (ZPE energy), because it is supposed, that it originates from quantum mechanical zero point oscillations. Though these oscillations are rather abstract, they are well known within quantum mechanics and have been so, for several decades.

The achievement of the article presented here is, that the author succeeded to make this ZPE energy of the vacuum, visible and manifest in the laboratory, by driving a rotor with it. This rotor spun like a typical rotor. It converted ZPE energy into classical mechanical energy, which was sufficient to surmount the friction within a real setup of a rotor and to drive it continuously.

The advantage of this rotor is, that the propelling energy is coming from mere space, of which there is plenty within the universe. Some of the ZPE energy [in all this universe] is flowing onto the surface of our earth and is ready for utilization.

Historical retrospection and comparison

In the early Middle Ages mankind did not have any awareness, that air is a tangible medium. In analogy to this, there was no awareness, that vacuum is a tangible medium, until the early 20th century.

In principle it would not have been necessary to perform any scientific experiments to recognize, that air is a tangible medium – were it not for a large intellectual barrier that took centuries to overcome. Only this intellectual barrier can explain, why people could not identify the air from the observation that birds can fly or even from the fact that wind exists. Without this intellectual barrier it should have been possible to understand the existence of the air within the 8th., 10th. or 12th. century. In reality, mankind needed until 1643, when Evangelista Torricelli came upon the idea, to remove the air from a closed volume to demonstrate, that there are some occurrences, which behave differently in the vacuum than in air. This was when the intellectual barrier was overcome and time was ripe for the PR-demonstration by Otto von Guericke, to bring the existence of the air into the consciousness of everybody. For his famous experiment with two evacuated hemispheres stuck together with a force stronger than horses could pull apart, he needed another 14 years to carry out this demonstration in 1657. His experiment brought the existence of air into the consciousness of everybody.

The analogy is obvious: My rotor will bring the existence of the ZPE energy of the space into the consciousness of everybody. It shall demonstrate that the vacuum is a real tangible medium. Torricelli used the pressure of the air for his demonstration, Otto von Guericke used the pressure of the air and the forces of horses for his demonstration. I used electrostatic and magnetic forces for my demonstration.

Now the demonstration (of the vacuum) is performed. It is reported in the further course of this article. But before this is described, I want to put the question, whether it would have been possible to overcome the intellectual barrier with our every day experience. The answer is simply yes, namely as follows:

From our childhood most of us know, that two magnets exert forces on each other even without touching each other. It can be an attractive or repulsive force, depending on the orientation of the magnets. Later we learn that sun, earth and moon exert forces onto each other, and of course they do not touch each other. But how about the medium which does the transmission of all these forces ? This is mere space; which can now be recognized as a material which transmits the forces of the fundamental interaction, such as gravitation and electromagnetic interaction (maybe also other fundamental interactions of physic). Even in modern particle physics, where the fundamental interactions are described by the interchange of special particles, those particles have to pass the space – or in other words: Space transmits these particles. The space does this transmission with a finite speed, namely the speed of light. However when we learn this (from the Theory of Relativity) we are already grown up, this means we have already lost our childish inquisitiveness, and so we forget to ask, which material properties of the vacuum are responsible for the transmission of the forces over distance. As we do not ask this question, we do not have the chance to recognize, that the vacuum is a material. But when I now pose the unusual question, why the vacuum has the characteristic wave impedance of 376.6 Ohm for electromagnetic waves, maybe the childish inquisitiveness awakes not only in me, but also in those who read this article. For me, this question was the activator to begin the investigation of the vacuum. And now – when I see the material properties of the vacuum, I recognize, that its energy is of great benefit to solve our energy problems.

But the very first step for a scientific approach to the understanding of the vacuum is coming from physical cosmology: The expansion of the universe. The speed of this expansion does not fit into the traditional theory, known as the standard model of cosmology. Today's generally accepted explanation of the speed of this expansion is the following: "Vacuum" is not "Nothing". For every cubic meter of "empty" space, a certain amount of energy can be ascribed. According to Einstein's mass-energy-equivalence ($E=mc^2$) this energy corresponds to a certain amount of gravitating mass. This means the vacuum has certain mass and this

mass leads to a certain amount of gravitation force – which should explain the speed of the expansion of the universe, but in reality it does not explain perfectly.

But how much is the weight of the vacuum ?

The answer is given as mass per volume, which leads to value in kilograms per cubic meter. Unfortunately the answer is not known unambiguously today. There are several answers. The discrepancies are tremendous. Some scientists speak about tiny fractions of grams, others speak about many many billions of tons. The discrepancy sometimes is said to be the largest discrepancy which ever occurred in physics. Mankind will solve this discrepancy, but I don't want to speculate in which century we will do.

In any case, most of the natural scientists agree, that mere space is a real substance to be taken seriously, and that it has some certain mass and thus energy. Because the whole universe consists of space, it is already included into the General Theory of Relativity, namely as the cosmological constant (with the symbol Λ). When Einstein introduced this cosmological constant into his theory, he did it because of pure mathematical reasons, but he did not see that it really exists, so he said, it was the largest folly of his life, to introduce this Λ . But in the meantime mankind learned, that it really does exist, and that it has a real effect, namely to influence the speed of the expansion of the universe, and it has a real reason, namely the energy of the space. Thus today the cosmological constant is taken serious.

In consideration of the fact, that we have the whole universe completely full of energy, it is not understood why mankind laments about a deficit of energy.

Compromising and destroying our environment with our energy policy is not the way to go. It would be much better to take a small fraction of the energy of the universe, not polluting our environment at all, and satisfy our hunger for energy completely. A small fraction of the energy of the universe is more than mankind can consume. We will, for sure, not be able to pump out the universe in a way that anybody would notice. This would be like drinking a mouthful of water from the ocean – nobody will see that the ocean will contain less water after drinking.

By the way, it should be mentioned, that two-thirds of the universe is vacuum energy. This is more than all visible matter, all galaxies, black holes, stars, planets, creatures and all the elementary particles not discovered until now. The prognosis is obvious: The universe gives us more energy than we ever can use.

And now let us tend our attention towards a possible technology, with which we can get this mouthful of sustainable energy, which is enough for all of us. This is what I developed, and what I describe in the further course of this article.

This technology has an essential advantage in comparison with all conventional energy sources: It does not combust or change any visible matter !

“Not combusting visible matter” – this is the crucial condition for being free of environmental pollution. Only if we can handle energy without converting or manipulating visible matter, is it a source of sustainable energy. This is not, what co-generation power stations do, neither nuclear power stations, not even fusion. All of them leave garbage on the earth, and all of them will end, as soon as the required material is exhausted. ZPE vacuum energy does not have this problem in principle.

This complexity of problems was understood by Nikolai Tesla more then hundred years ago. He expressed his hope, that mankind will learn earlier or later to handle energy without combusting matter. At his time he had no guess how to do that. The intellectual barrier was too large. But he was right: Mankind learned. Even if it was not earlier but later – time is ripe now, and we shall do it.

Alternative Technologies and current state of the art

The necessity not to combust matter does not stringently demand the use of ZPE-energy. Alternative solutions to our energy-problem could be for example wind power stations, solar power, the use of geothermal energy, just to mention some possibilities. They all are sustainable. They are fine, as long their difficulties do not disturb. For instance tidal power stations are not possible everywhere, wind power stations depend on weather.

Thus it is worth considering the usage of ZPE-energy. “Space” is everywhere, permanently, steadily, constantly, to be used freely by all human societies, as long as the universe exists.

Up to now, only fundamental research about ZPE-energy has been done, which led to the prototype rotor, converting a few Microwatts of ZPE-energy into classical mechanical energy. This is a great advance, because we now know, how to use ZPE-energy, but the large-scale realization to construct and build power stations is still an open challenge. The principle of the ZPE-energy conversion is rather simple and energy should be much less expensive then today when using ZPE-energy. This means that we can have much more energy, for a given amount of money, than we can have with conventional technologies.

The fundamental physical principle of the use of ZPE-energy is described in the following chapters.

Theory of the conversion of ZPE-space-energy into classical energy

Let us begin with the principle of the successfully tested conversion of ZPE-space-energy into classical mechanical energy. The setup of the apparatus is rather simple, as shown in Fig.1. In the upper part of the drawing we see a disc (red), which we want to call “field source”, because it produces an electric field. Underneath there is a rotor (blue) which rotates around a vertical axis, as soon as electric field (produces by the field source) is strong enough.

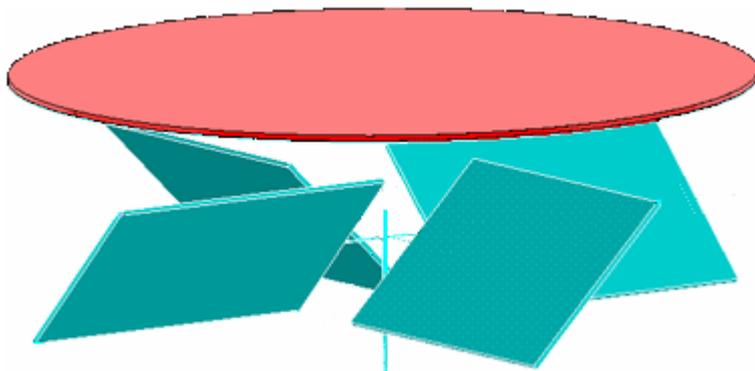


Figure 1:
Sketch of the principle of an engine converting ZPE-space-energy into classical mechanical energy. The red field source is charged up electrically, the blue rotor is connected to ground. By this means an electric field is produced, which drives the rotor.

This looks rather simple and it works as simply as it looks. This takes a very small amount of electrical energy, just to charge up the capacitor sufficiently. As soon as this is done, the rotor will endlessly rotate. The mechanical energy produced in the experiments carried out up to now are just even enough to surmount the friction of the bearings, so that the rotation can really be seen. This means that the rotation was really observed. This is not a very complicated apparatus. In the experiments conducted up to now, I have built rotors from one to eighteen inches diameter.

Large-scale applications will require more energy and more machine power. This needs large-scale diameter of the rotor, because of the given energy-flux which space provides. Theoretical computations allow the estimation of the relationship between the size of the rotor and the produced power of the machine. For instance, a pile of rotors with 100 meters diameter and 20 meters height may produce a machine power of about 2-3 Megawatts.

Of course conventional nuclear power stations have much more energy density, but this is not a serious criticism, not only because of the environmental argument. The ZPE-space-energy rotor has a further important advantage: It can be used in a wide range of sizes to suite local energy demands. In other words: It is possible to build ZPE-space-energy rotors with adequate size, wherever energy is needed. This will not only minimize energy losses during energy transportation, but it furthermore allows to set up ZPE-space-energy rotors without compromising the landscape. A power station is not the very best adornment of the landscape. ZPE-space-energy rotors could be placed below the cellar of houses. A rotor of 10 Meters of diameter below a family home can be estimated to produce an engine power of about 10 ... 20 ... 30 Kilowatts. And because this power production is permanent, 24 hours a day and 365 days a year, the power is much more than the house needs. By this means, it might be possible, to accommodate a large power supply below houses and buildings, not disturbing anybody at all. Industry with large power consumption could have a building dedicated for power supply. Dimensions of ZPE-space-energy rotors are free scalable.

An often-heard question:

If the principle is that simple – why was it not discovered much earlier ?

Well, there are two reasons. On the one hand the existence of ZPE-space-energy was identified not long ago. On the other hand, the proper understanding of the conversion of ZPE-space-energy in scientific terms, requires a lot of interdisciplinary Theory within Physics and Engineering, for example Technical Mechanics, Electrodynamics, die Theory of Relativity, Quantum Mechanics, Quantum Electrodynamics and parts of Cosmology. This interdisciplinary theory makes it difficult to overcome the intellectual barrier, because normally Physicists work in highly specialised areas of research and not mainly interdisciplinary areas. The main obstacle is probably the fact, the ZPE-space-energy was discovered not long ago, and thus it is not yet well known to those who are experts in Mechanics, Electrodynamics, and so on.

Let us now have a short glance to the theory behind the ZPE-space-energy rotor:

A characteristic feature of the development is the perception, that not only electromagnetic waves propagate with the speed of light (this has been well known for a long time), but also electrostatic and magnetic DC-fields propagate with the same speed. This is a feature of space, known from the Theory of Relativity, but it exceeds the statements of Maxwell's classical Electrodynamics. This makes electric charge to sources of the electric field, which permanently emits energy into space. But from where does this energy originate ?

Because electric charges can emit this energy even if they are in connection with nothing else but only with the empty space, the only possible provider of this energy is space. But we know, that space is not pumped out during time, so this means in consequence, that the space extracts energy from the propagating fields themselves. This cognition is confirmed by computations of the energy density of the propagating fields through the empty space following Maxwell's formalism of Electrodynamics. Because the consequent calculation of theory confirms, that space extracts energy from the propagating field and supports field sources with energy, which is necessary for the emission of the field, we have a permanent energy-cycle between the field source and the space. This cycling energy is a part of the ZPE-space-energy as can be show with an analysis of Quantum Electrodynamics.

The logical next step of course is the idea, that we now want to extract some energy out of this permanent energy cycle inside space. One possible way to get this energy is to use a ZPE-space-energy rotor. I do not want to say, that this will remain the only possible way forever, but up to now, I do not know any other way. So we want to look at what the ZPE-space-energy rotor does:

The rotor-blades consist of metallic surfaces. Metallic surfaces shield electric fields, in the following way: If there is an electric field going from one side onto the surface of the metallic surface, the field will not pass, so there will not be any part of this field on the other side of

the metallic surface. From the point of view of the field-energy this means: From one side, the energy reaches the surface, but this energy never arrives at the other side of the metallic surface. If you believe in energy-conservation (I do), the metallic surface is the device taking up the energy which is transported by the field. This is a logic consequence, because there is no other pathway for the energy to go. This is the way in which metallic surfaces intervene into the energy-cycle between the electric charge and the space. Thus we understand how the ZPE-space-energy rotor is driven:

An electric charge gets energy from the ZPE-oscillations of space (which are part the space-energy) and converts this energy into electric field energy. This electric field energy propagates into space, but while it propagates meter by meter, part of it is re-converted into space energy. If this propagation is interrupted by a metallic rotor-blade, the metallic surface takes the complete remainder of the field energy, namely this field energy which was not absorbed by the space on its way from the field source to the rotor. How do we notice the absorption of energy in the metallic surface ? The answer is very direct: We see a mechanical force, which causes a movement of the rotor-blade. This force can be calculated by Maxwell's Electrodynamics with the use of the so called image-charge-method. This is a well-established method of calculation. Thus the result of this calculation is not surprising. By the way, it should be reminded, that most of us know these electrostatic forces acting on surfaces, from childhood, where our parents demonstrated that an electrically charged plastic ruler or an air balloon attracts small paper-confetti. The reason is clear now: The field cannot pass the surface of the paper, and thus the paper is attracted.

If the metallic rotor-blades are mounted in a way that they can follow a rotation, we will directly see this type of movement as soon as field source (see Fig.1) is charged up electrically. This is also possible if the field source is a charged air balloon. This is also experimentally proven. The essential difference between the paper confetti and the ZPE-space-energy-rotor is the fact, that the rotor does not alter its distance from the field source. Yes: It rotated, but it does not alter its distance. This means that the driving energy is not simply the energy from the electrostatic potential, because the rotor does not alter its position within this potential. By the way: If the electric field is not very homogeneous and there is some gradient in the potential, this will disturb the rotation remarkably.

The intellectual barrier, which prevented mankind from discovering this simple principle before the 21st century, was the fact, that there was no expectation of such a rotation. There is no classical (visible) energy driving the rotor, so nobody could imagine, it might happen. Thus nobody tried. In 2008 time was ripe to understand the ZPE-space-energy as a source of rotation, so the rotor could be discovered.

Successful experimental proof of the conversion of ZPE-space-energy

It is a matter of fact, that a new theoretical model can be only accepted after it is proven experimentally. Experiment decides, whether a theory is right or not. Consequently several ZPE-space-energy rotors have been built, mounted underneath a field source of appropriate diameter – and they rotated as soon as a sufficient amount of electrical charge was brought onto the surface of the field source. Well, some experimental parameters had to be adjusted in an appropriate way. I described how to do this within several scientific publications.

The very first trials had been conducted in a normal room containing air. This lead to critical questions from scientific colleagues, whether this very special type of visible matter, the air, might allow an explanation of the observed rotation. The underlying mechanism would be the ionization of some molecules of the air. The ions might be accelerated by the electrostatic field, causing a recoil which might drive the rotor-blades. Such a mechanism has been known for many decades (two patents by Biefeld and Brown in 1928 and in 1965), and it works

completely on the basis of classical electrical energy without any connection to ZPE-space-energy.

The consequence is obvious: The air has to be removed for the experiment: The experiment for the verification of the ZPE-space-energy has to be performed inside the vacuum. It was performed in the vacuum and it was successful. The ZPE-space-energy rotor works in the vacuum. Since I published this, the doubtful colleagues became silent.

For the sake of completeness it has to be said, that the rotor spins remarkably slower in vacuum than in air. This means that the ionization mechanism of the air molecules causes some driving force. So the critical questions of some colleagues had justification. But the main result of the vacuum-experiment, performed with different rotors of different shape, using different vacuum chambers, is: The ZPE-space-energy rotor rotates inside space without visible matter. On the one hand this confirms the conversion of ZPE-space-energy into classical mechanical energy, but on the other hand, there is a further aspect: A large-scale technical application shall be done inside a vacuum chamber (or in the universe) in order to be profitable. This is necessary to avoid isolation losses due to the movement of ions, which transport electric charge between the field source and the rotor-blades.

Additional notice:

There is a magnetic principle driving a magnetic rotor in very close analogy to the electric principle. But up to now, the magnetic principle is only in the state of planning. The theory is developed and an experimental design is constructed, but the magnetic conversion of ZPE-space-energy is still to be done. The analogy of a metallic surface shielding the electric field is a superconducting surface shielding the magnetic field, because superconductors act as ideal diamagnets. Similar as metallic surfaces interrupt electric fields, diamagnetic surfaces interrupt magnetic fields. But there is one important difference between the electric forces and the magnetic forces: The electric forces are attractive, but the magnetic forces are repulsive. From the theory point of view, this would cause the magnetic ZPE-rotor to rotate in the other direction than the electric ZPE-rotor. But in the real experiment, this difference causes several technical difficulties with the bearing of the axis of the superconducting rotor. These technical difficulties are the reason, why the verification experiment of the magnetic ZPE-rotor is not yet ready. One of the technical difficulties is the extreme homogeneity of the magnetic field necessary for the rotation of the magnetic ZPE-rotor, which is much more difficult than minor requirements to the homogeneity of the electric field for the electric ZPE-rotor. Nevertheless the magnetic rotor is an interesting alternative because of its energy density. The field strength within an electric ZPE-rotor is restricted by the breakthrough of the electric field, but the magnetic field does not experience such a restriction of breakthrough, and therefore a restriction of energy density.

Further remark: Up to now, there are several electric ZPE-rotors converting machine power of a few Microwatts. This is known from reliable measurements of the produced machine power and it confirms the theoretical expectations for the small rotors that have, up till now, been under investigation. This makes clear: The principle of the electric conversion of ZPE-space-energy is successfully verified. Now the time is ripe to begin a large-scale development to establish electric ZPE-rotors converting machine power of Kilowatts and Megawatts.

The measurement of actual power, generated by the machine, refutes the very last objections that have been made. Some colleagues presented the counter-argument, that there might be some unknown way, along which some electric power from the field-source finds its way to the rotor in order to drive the rotor. In that scenario, the rotor would not be driven by ZPE-space-energy but would be driven by classical electrical energy. Sceptics have been united in one argument, which has a clear logic: All doubts could be certainly removed if it would be possible to optimize the isolation to the extent, that the electric power loss due to imperfections of the isolation, [which is necessary to keep the electric field of the field-source

