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Abstract

The interpretation of the causality of the gravitation field can be changed considerably.

The cause of gravitation

The cause of the gravitational field is almost invariably seen as a single mass or a group of mass carriers which have a common center of gravity. We are faced with the gravity field because things have weight or due the fact that acceleration confronts us with inertia. From deeper knowledge, we learn that the gravitational field is associated with the curvature of the space that surrounds us. In our immediate environment the effects of curvature (other than weight) are barely noticeable, but there are places in the universe where the curvature is much stronger and causes significant effects.

From these experiences the false idea may emerge that the gravitational field acts as the cause of curvature. However, that is a reversal of affairs. The gravitational field is no more and no less than the accurate administrator of the curvature of the local space. Therefore the value of the gravitational field is not a simple number. It is a tensor that exactly represents the local curvature by using a matrix of characterizing numbers. This matrix can vary from place to place.

We can go a step further and argue that the gravitational field designates the points on which the cause of the curvature seems anchored. Actually, these point-shaped mass carriers do not need to exist. It means that there may also be other causes to be coined for the curvature. An example is formed by an anomaly in the local geometry that is surrounded by a different structure of the normal curvature.

A black hole can be considered as such a geometric abnormality. A black hole is surrounded by a very strong curvature field such that information can no longer pass the skin of the hole. Therefore the hole can as well be completely empty. What happens to the material that is sucked up by the black hole? Well, that will be ripped apart into its smallest possible parts. Part of the debris is used to widen the skin of the hole. The other part escapes from the absorption process and is reflected back. The hole gets bigger, but that only becomes visible via the enlargement of the skin. The surface of the skin gives an indication of the mass, which the hole represents. The curvature around the black hole is in correspondence with this mass. However, the hole itself is empty.

The skin of the black hole can be seen as a collection of ground states of absorbed particles. Each of these ground states occupies a very small part of the surface and each represents a minimum amount of information. In this way is the entropy of a black hole relates to the surface of the skin.

The holographic principle corresponds to the statement that a black hole is the most efficient form of packaging entropy. This means that the entropy of the material that is included inside a closed surface is equal to the entropy of a black hole that contains the same amount of material. Usually the skin of that black hole includes a much smaller volume than the volume inside the original closed surface. This leads to the conclusion that a closed geometrical abnormality may be regarded as an information safe.

If this picture is correct, then nature might perform this trick more often. What to say of the idea that all elementary particles that have a mass, contain in their inner a small geometric abnormality that is responsible for the gravitational field of the particle.

The question results of what causes this abnormality. The physical fields that belong to a particle determine what is present in the domain of that quantum. These fields are quaternion valued probability amplitude distributions. The square of the modulus of these distributions is a probability density distribution of the presence of the quanta considered. At places where nothing is allowed to be present, in fact a geometric abnormality emerges in the form of a hole. The hole represents the mass of the particle.

The gravity field is thus a very different type of field than the fields that belong to the quanta.

What about inertia? This effect is caused by the collaboration of all geometric abnormalities. The most distant abnormalities play the largest role. Further away, the influence of a single abnormality falls off quickly with distance, but the number of participating abnormalities increases much faster with that same distance. Moreover, the influence of differences level out due to averaging over an increasing number of contributions. It looks as if a uniform background attracts the local object from every direction. Because the forces come in equal size from all directions nothing happens. In a similar way nothing will happen as long as the object moves in a uniform manner. If the object accelerates, then according to field theory, this goes hand in hand with the presence of an additional gravitational field that counteracts the acceleration.

So it is not surprising that physicists cannot reconcile the electromagnetic fields and the weak and strong binding fields with the gravitational field. Apparently the gravitational field is a field that is caused by the other fields. All other fields are quaternionic probability amplitude distributions that belong to quanta.