

On the Origin of Mass

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Abstract

Mass is caused by fields of elementary particles that are able of creating cavities at their center. Another cause is the presence of a different geometric anomaly such as a black hole.

The origin of mass

Geo-cavities

Geo-cavities are geometrical abnormalities in the form of holes in the local geometry. They are surrounded by a very strong local curvature, such that information can neither enter nor leave the skin of the geo-cavity.

Inside the hole no coordinates exist. The coordinates circumvent the geo-cavity.

Geo-cavities have mass. This mass relates to the area of its skin.

Reference coordinates

The situation can be described by two coordinate systems. One is a flat reference system the other is approximately flat, but it can locally be strongly curved. The reference system can be used to locate the geo-cavities in the curved system.

Elementary particles

The equation of motion of an elementary particle is a continuity equation. It means that describing the motion of elementary particles is in fact a streaming problem. The general form of the equation of free motion of a massive elementary particle is¹:

$$\nabla\psi^x = m \psi^y$$

Here the quaternionic nabla operator is the transporter. ψ^x is the transported quaternionic field sign flavor². ψ^y is the coupled quaternionic field sign flavor and m is the coupling factor.

¹ <http://www.crypts-of-physics.eu/EssentialsOfQuantumMovement.pdf>

The ordered pair $\{\psi^x, \psi^y\}$ identifies the quantum type. The field configuration determines the coupling factor.

The coupling factor m follows from:

$$\int_V (\psi^{y*} \nabla \psi^x) dV = m \int_V (\psi^{y*} \psi^y) dV = m \int_V |\psi^y|^2 dV = mg$$

The two fields shear. At the location of the sign switch the fields produce a geo-cavity. The size of this geo-cavity is determined by the strength of the coupling factor m .

This geo-cavity is surrounded by a curvature of the geometry that is so strong that information cannot pass the skin of the geo-cavity. Outside of the geo-cavity the curvature follows a pattern that corresponds to the rest mass of the particle.

The gravitation field administrates this curvature³.

Black holes

A black hole can be considered as 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 black hole fulfills the definition of a geo-cavity. However, it is a large one.

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 start cavity

At its start the universe may have consisted of space that was empty except for a large geometric abnormality. It was a geo-cavity with nothing outside its skin and nothing inside its skin.

The skin consisted of ground states of particles. This cavity appeared to be instable and imploded⁴. The debris spread through the space that came available. The ground state obtained energy and their fields unfolded.

The size of the start cavity was huge and so was the mass that it represented. This mass was converted to energy, which became attached to the ground states.

The start cavity fits in the definition of a geo-cavity.

² Quaternionic fields have sign flavor. Elementary particles have flavor.

[http://en.wikipedia.org/wiki/Flavour_\(particle_physics\)](http://en.wikipedia.org/wiki/Flavour_(particle_physics))

³ <http://www.crypts-of-physics.eu/TheCauseOfGravitation.pdf>

⁴ This differs from the picture that corresponds to the Big Bang.