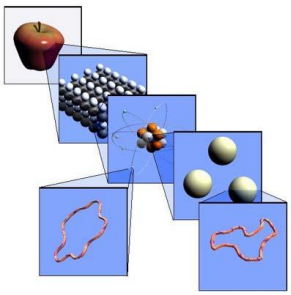
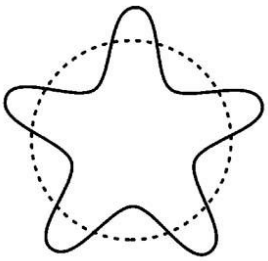
Dimensions And Waves

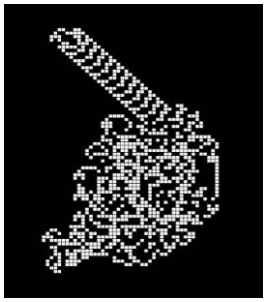
Alp Cömer

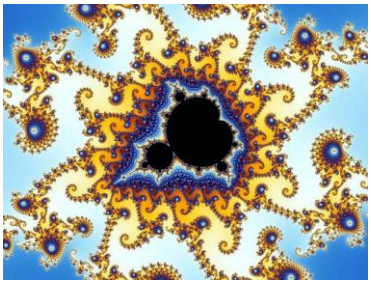
Philosophically or metaphysically, I can't fully explain the question of life, the universe, and everything else. But as we all know, 42 is the answer to all questions.
Although I've studied the natural sciences intensively, I reached a point where it seems like I can't go any further. However, I continually discover more fundamental and deeper insights. Like a puzzle. Here's a small part of my scientific thinking:
Basically, everything consists of dimensions and waves. Similar to waves on the surface of water. The dimensions represent the water surface, i.e., the medium. Fluctuations within the dimensions. In my mind, the waves are light. It may be a bit difficult to understand, but these ideas are reflected in string theory.



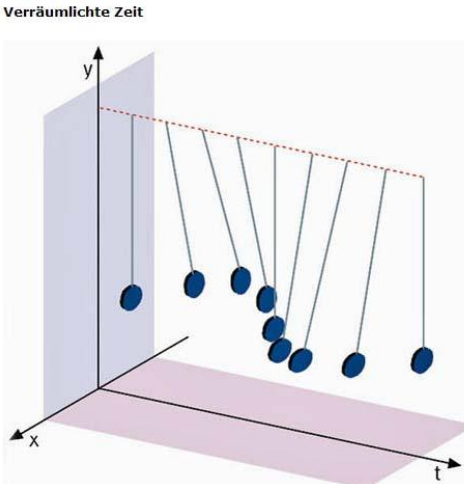


Fundamentally, everything (light and matter) has a dualism between wave properties and particle properties. However, the particle property is only a secondary consequence of the wave. The wave propagates in all directions, but through our observation, this multidimensional holoreality decays into a lower-dimensional wave. This causes the particle property. Through the influence of an observation, the wave function is reduced to a possible reality. However, this is only a fragment of an ndimensional space-time. At the beginning of a universe, there are only these elementary waves, which then organize themselves. Similar to Langton's ant or a fractal.





Time is an extremely persistent illusion. One must imagine it as another spatial dimension. The "flow" of time is an illusion within the framework of relativity theory. Everything is, so to speak, fixed "all at once" in space-time. The graphic illustrates this illusion using a swinging pendulum. The "space-time block" is represented by the time coordinate t and two spatial coordinates x and y; the third dimension of space cannot be shown here.



What would happen if matter consisted of elementary waves without rest mass? Can our ideas and knowledge about the waves we know from the macroscopic world be partially transferred to light waves and the structure of matter? How would matter behave in space and time if, at its core, it consisted of electromagnetic waves?

A brief history of special relativity:

The Michelson-Morley experiment, conducted towards the end of the 19th century, yielded a constant speed for light, independent of its relative speed to the light source. This was interpreted as a contradiction to the then-prevailing ether theory as an absolute reference system. At the same time, this result contradicted the idea that velocities behave additively in physics. This incompatibility with the physics of the time led to a mathematical adjustment of the dimensions of length and time, the Lorentz transformation.

Time dilation: $t' = \frac{t}{\sqrt{1-\frac{v^2}{c^2}}}$ Length contraction: $x' = x \sqrt{1-\frac{v^2}{c^2}}$

Einstein declared these equations, initially considered artificial, to be real. He also applied the Lorentz transformation to masses and derived the mass-energy equivalence in his special theory of relativity.

Thought experiment: A clock based on an electromagnetic wave

Let's return to my assumption that matter consists of waves without rest mass. That is, electromagnetic waves or light. How would matter behave if we moved it at a certain speed?

To do this, imagine a clock consisting of a light beam and two mirrors. The light beam oscillates back and forth between the mirrors. What happens if we move this clock in the direction of the light beam?

If the clock is not moving, the time it takes for the light beam to travel the distance between the two mirrors in both directions is:

(t = Time ; s = Distance between the mirrors; c = Speed of light)

$$t = \frac{2s}{c}$$

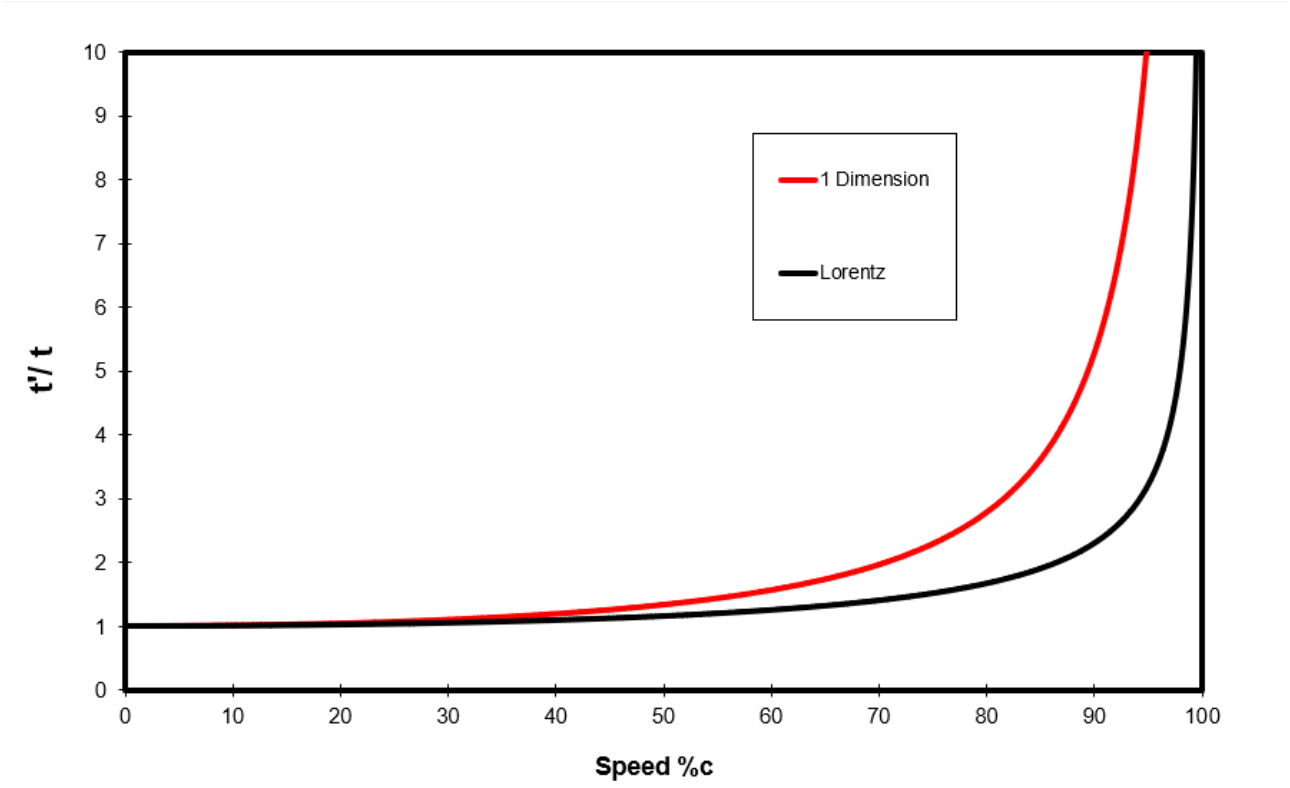
However, if this clock moves with the speed v in the direction of the light beam, the time t' is:

$$t' = \frac{s}{(c+v)} + \frac{s}{(c-v)}$$

This results in the ratio of time t to dilated time t':

$$\frac{t'}{t} = \frac{c^2}{(c^2 - v^2)}$$

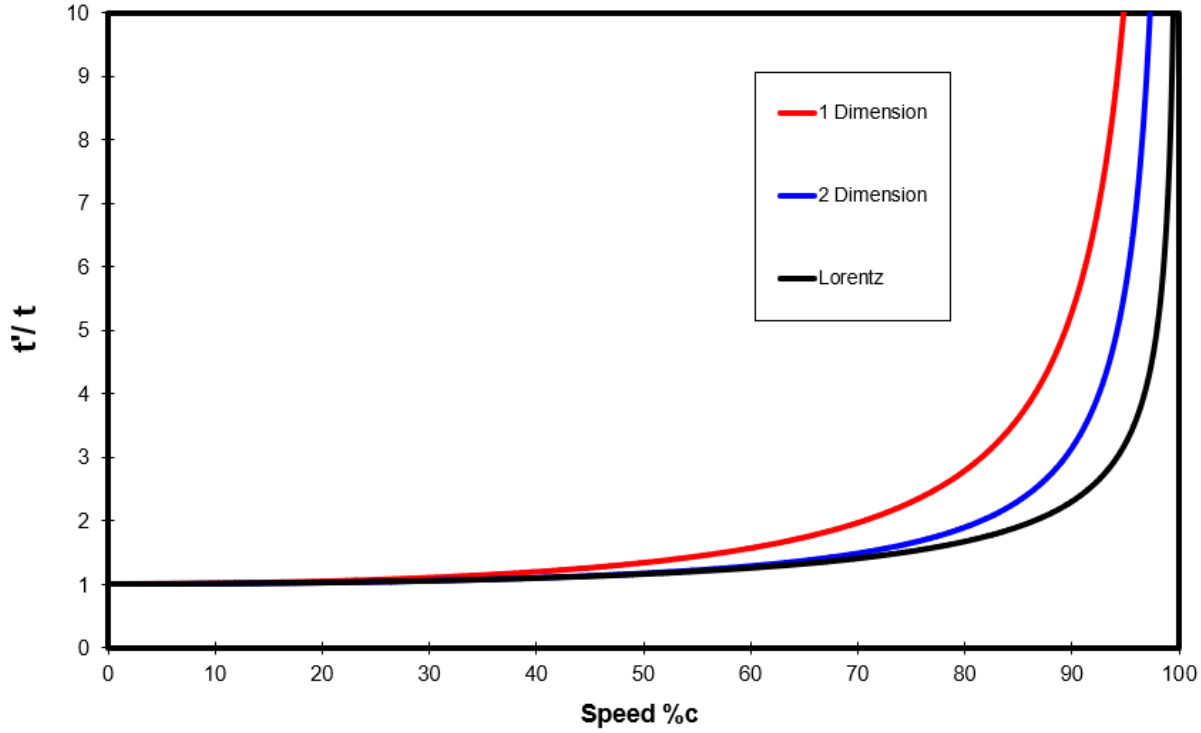
If you now plot the velocity v against t'/t, the following diagram results (the Lorentz transformation serves as a reference)



In this case, we considered a 1-dimensional clock. What happens when we include 2 dimensions? Let's imagine the light beam moving in 2 dimensions.

The following equation results for the relationship between extended time t' and normal time t:

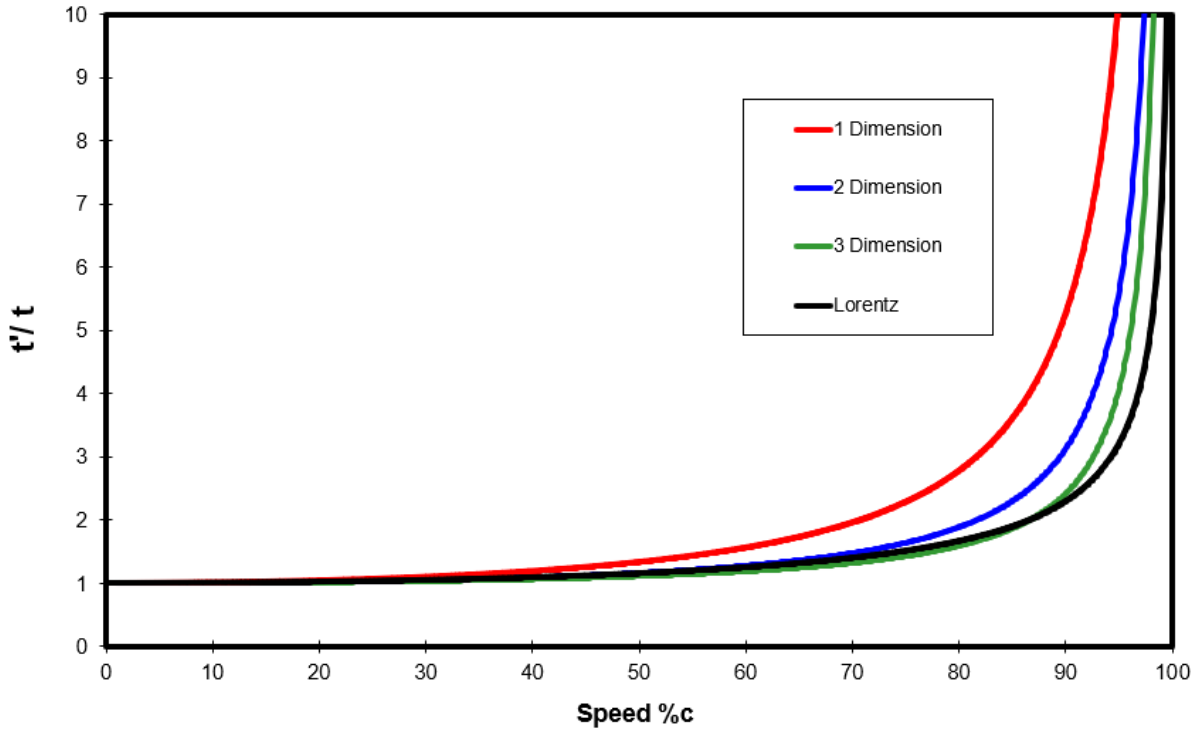
$$\frac{t'}{t} = \frac{\frac{s}{c+v} + \frac{s}{c-v} + \frac{2s}{c}}{\frac{4s}{c}} \quad \text{or} \quad \frac{t'}{t} = \frac{c^2}{2(c^2 - v^2)} + \frac{1}{2}$$



It's noteworthy that the 2D curve based on my equation lies midway between my 1D curve and the Lorentz transformation curve. Does including the third dimension lead to the Lorentz transformation?

If we now consider the 3rd dimension, we get the following equation:

$$\frac{t'}{t} = \frac{\frac{s}{c+v} + \frac{s}{c-v} + \frac{4s}{c}}{\frac{6s}{c}} \qquad \text{or} \qquad \frac{t'}{t} = \frac{c^2}{3(c^2 - v^2)} + \frac{2}{3}$$



The 3D curve is already quite close to the Lorentz transformation and thus to reality. The reason for the difference between my equations and the Lorentz transformation is probably due to length contraction. The clock in the 3D conceptual model is constructed so that a light beam travels back and forth in the direction of motion (X direction) and simultaneously in the Y and Z directions, where the movement of the clock is not noticeable as time dilation. For the time dilation, I assumed an unchanged length in the X direction. However, time must be taken into account. The reason for the speed of light being independent of speed lies in the way light propagates. Light actually propagates spherically in all directions, and the time dilation is therefore isotropic.

One could now understand this as a justification for the existence of an ether and thus an absolute reference system. However, this is not entirely the case. The dimensions are the "ether," but this does not imply an absolute reference system.

Finally, three more arguments for the assumption that matter consists of light at its core:

1. When matter and antimatter collide, their internal structures dissolve, producing only light.

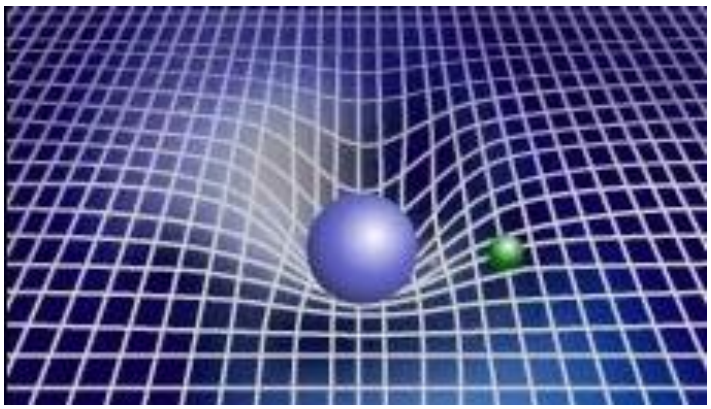
2. There is also the reverse process: pair production. Photons can convert into matter and antimatter upon collision.

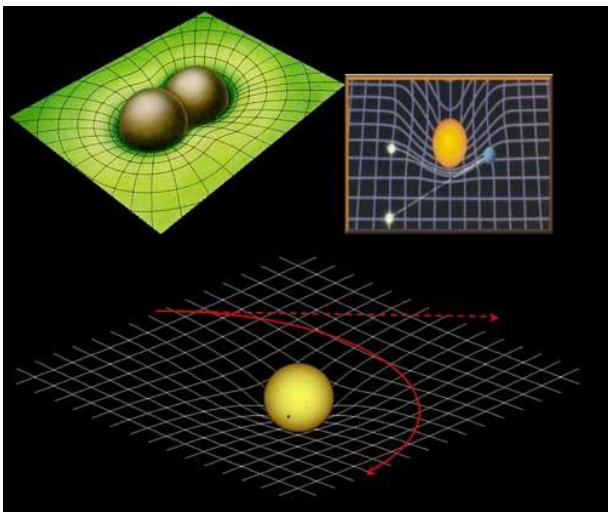
3. If matter were made of sound waves, it's easy to imagine that nothing could move at a speed greater than sound. Since matter consists of light, or at least of previously unknown, elementary waves without rest mass, the speed of light is an unattainable limit.

Photons are the only known particles without rest mass. Electromagnetic waves, like all waves, exist only in motion. All dimensional waves move at the speed of light. The rest mass of matter results from the energy of the electromagnetic waves and is related to the amplitude of the wave. The surface or spatial integral of the wave crest is always the same. This is referred to as quantum. Only the wavelength varies. Shorter wavelengths therefore increase the amplitude.

The four known fundamental forces in physics and "Dark Energy" and "Dark Matter"

How can the forces in nature be explained by the fact that matter consists of waves? If one assumes that matter consists of waves that move in a circle, one can imagine that these space-time fluctuations lead to a general curvature of the surrounding dimensions. Gravity is therefore only an apparent force.



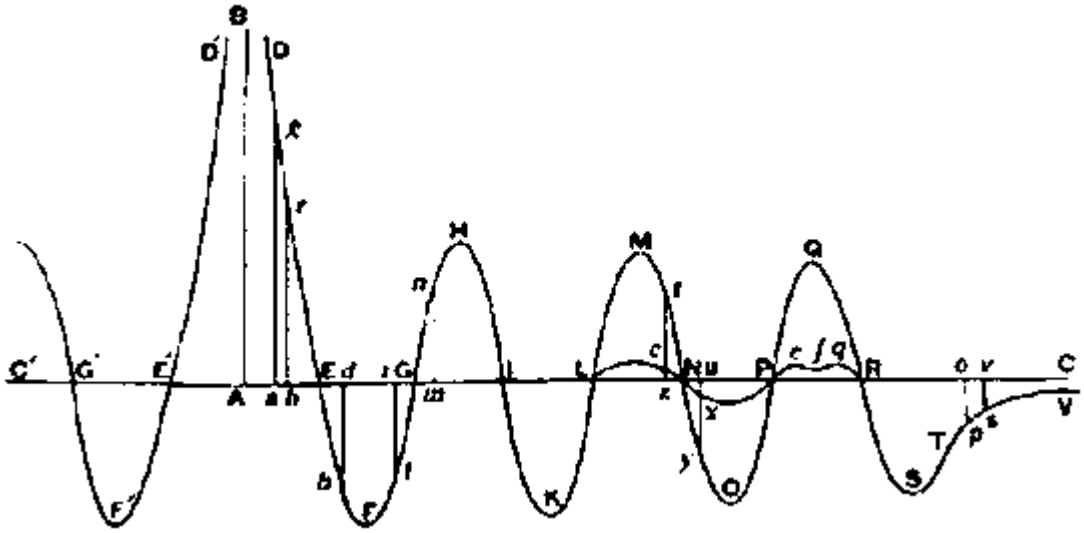


How do the 4 fundamental forces of physics arise: strong nuclear force, weak interaction, electromagnetic force and gravity?

A historical review is quite interesting here. A particularly remarkable, yet largely neglected figure in the history of modern natural science was Roger Bosćovič.

Roger Bosćovič was a Serbo-Croatian Jesuit, poet, and architect, advisor to popes, a cosmopolitan belonging to the upper class, a diplomat and businessman, a theologian, a government advisor, and a member of the Royal Society, but above all, a mathematician and scientist. He was one of the few universal geniuses in the history of science. In 1753, he published his major work, his "Theoria Philosophiae Naturalis." In it, he attempted to derive all observed physical phenomena from a single law.

Based on his force law, the four fundamental forces merge into each other and their direction, i.e. attractive or repulsive, reverses with increasing distance between the two mass points:



At the time of the publication of his major work in 1753, gravity was the only known force in nature. Over the next two centuries, the electromagnetic force, the strong nuclear force, and the weak interaction were discovered one after the other. Based on this more than 200-year-old force law, these four forces—the strong nuclear force, the weak interaction, the electromagnetic force, and gravity—merge into one another as the distance between the masses increases, with the signs reversing and the magnitude of the force decreasing. I am certain that there is at least one other fundamental force in physics that has a repulsive effect at very large distances. Measurements of the redshift during stellar explosions (supernovae) have shown that the expansion of the universe over time, due to the attractive effect of gravity, does not slow down, but rather accelerates. In my view, this accelerated expansion of the

universe is a clear indication of the existence of a force that opposes gravity at very large distances.

However, Einstein's cosmological constant has the same value everywhere in the universe and, in my opinion, is unsuitable for explaining this phenomenon. It is an artificial value that was subsequently introduced to support the steady-state theory. The steady-state theory served as an explanation for what was considered a static universe at the time. It is considered disproven and was replaced by the Big Bang theory after the discovery of background radiation. There is no plausible and understandable explanation for the existence of such a constant.

Bosćovič's force law provides an alternative and, in my opinion, more coherent explanation, which can be derived from the shape of the curve: The curve of the curvature of dimensions resembles an elongating standing wave. Expansion and compression alternate as elongation strength decreases. Matter causes this expansion and compression and is very unevenly distributed in the universe. Between the collections of galaxies and star clusters, there is essentially empty space. In the collections of matter, the spatial dimensions are compressed. In the quasi-empty space, the spatial dimensions are expanded. This can also be described as an alternating compression and rarefaction of the dimensions with increasing distance between the collections of matter. Or as positive and negative curvature of the dimensions. The expansion of the spatial dimensions is called "dark energy." At even greater distances, this repulsive force then becomes an attractive force again. The compression of spatial dimensions is also one reason for the assumption of the presence of "dark matter." Within spiral galaxies like the Milky Way, it overlays the curvature directly caused by gravity at lower scales. Therefore, the attractive gravity in these spiral galaxies is amplified by a superposition. This explains why the measured rotation speed of spiral galaxies is higher than expected.

The terms "dark energy" and "dark matter" are misleading. Using differential geometry, these phenomena can be understood as positive and negative curvatures of dimensions at larger scales.

Alp Cömer

Created: November 6, 2006 / Last modified: April 4, 2025