Quanta transfer in space is conserved

Sydney Ernest Grimm*

Physical phenomena emerge from the quantum fields everywhere in space. However, not only the phenomena emerge from the quantum fields, the law of the conservation of energy must have its origin from the same spatial structure. This paper describes the relations between the main law of physics and the mathematical structure of the “aggregated” quantum fields.

Introduction

The law of conservation of energy is the main law in physics. Its existence originates upon the phenomenological view of reality: local additions and subtractings of energy in relation to the mutual changes of observable phenomena. This point of view presupposes a fundamental difference between the phenomena and the surroundings of the phenomena in the universe.

Modern physics has abandoned this concept of reality. Quantum field theory has replaced the phenomenological point of view and all the phenomena are thought to emerge from the creation by the underlying basic quantum fields.[1] Distinct fields that are existent always and everywhere in the universe. Albeit not all the known phenomena have a consistent theoretical description in quantum field theory. For example gravity.

Quantum reality is far more complicated than reality by the phenomenological point of view, because the latter is a simplification of quantum reality. Therefore, it is natural that we use the phenomenological point of view to calculate the properties of the phenomena within the microcosm.

It is not possible to calculate all the alterations between the distinct basic quantum fields within a certain volume of space. Even the calculations of all the alterations during a very short time within a volume that encloses a hydrogen atom is impossible without implementing empiric data.

Notwithstanding the fact that the law of conservation of energy originates from the phenomenological point of view, the conservation of energy must be consistent in quantum field theory too. However, the concept of quantum field theory is not restricted to the observable phenomena within the quantum fields.

These phenomena represent only partly all the existing quanta in the universe because everywhere in space there is a transfer of energy. Phenomena like particles are just concentrations of energy – quanta – that have only partly independent properties during a limited period of time.

We cannot postulate the conservation of energy between volumes of space – in fact volumes of enclosed quantum fields – with the same size and shape. It is clear that there is an energy difference between $1m^3$ of the volume inside our sun and $1\ m^3$ somewhere in a void between the galaxies.

So the question is: “*What about the mechanism behind the conservation of energy, caused by the structure of the basic quantum fields*?”

The Planck-Einstein relation

The only phenomenon that’s observable everywhere in the universe is the electromagnetic wave. So if we want to discover a “gleam” of the basic structure of the quantum fields within the frame of reference of modern physics we have to examine electromagnetic waves, travelling in space.

The properties of electromagnetic waves – as a stream of single quanta – are described by the Planck-Einstein relation:

$$E = h\nu = \frac{hc}{\lambda}$$

[h = Planck's constant; ν = frequency; λ = wave length; c = speed of light]

The equation is really remarkable because nearly every quantity is a constant. The only exception is the wave length. Unfortunately, an equation with all constants and only 1 exception – a property that is an undetermined variable – is logically inconceivable. Why should the universe make a difference between the nature of properties that are 100% related to each other? All are constants and one is a variable?

They all emerge from the interactions between the underlying structure of the basic quantum fields, so why are some properties constants and other variables?

Why isn't the wave length a constant? Probably because it was not customary to imagine that the curvature of space – Einstein's theory of general relativity – can have a constant that determines length. However, the wavelength of electromagnetic waves is enormous in relation to the smallest elementary particles so there is no “empiric” argument to reject an invariant basic wave length. Especially because the existence of a minimal length scale is well known in theoretical physics.[2]

Of course, the mutual interactions between local macroscopic phenomena show all the characteristics of curved space-time as described by Einstein's theory of general relativity. That's why in the past the physics text books have taught us that Einstein's space-time is the underlying fabric of the universe, perfect in line with the observations.

This in contrast to the axioms of Isaac Newton about absolute space and absolute time. But that's just a believe. There is any proof to support this opinion. Because without phenomena there is still the structure of the creating basic quantum fields.[3]

The Planck-Einstein relation shows the determination of the energy by the wave length. Therefore, I can express the wave length with the help of a new constant:

$$\lambda = n\,\underline{\lambda}$$

[n = integer (variable); $\underline{\lambda}$ = standard length]

So $\underline{\lambda}$ is a constant and named “standard length” in this paper (the underline is used to show the difference).

Now we can rewrite the Planck- Einstein relation:

$$E = h\nu = \frac{hc}{n\underline{\lambda}}$$

The revised equation shows that energy is inversely proportional to the number of standard lengths by which a single quantum is transferred (the outcome is equal to the unmodified equation).

The spatial structure of quantum fields

Suppose we increase the energy of the electromagnetic wave. The result is a decrease of the number of standard lengths between the beginning and the end of 1 electromagnetic waveform. The limit is n = 1 $\underline{\lambda}$, but because of the nature of electromagnetic waves the minimum length scale must be half the size of the minimum electromagnetic wave length. See the schematic “cross section” of a wave form in figure 01 below with the help of an easy to draw metric.

However, what is represented by the size of the standard length? When we think it over we have to conclude that the standard length is a property of the structure of the creating basic quantum fields. Moreover, the equation makes no difference in relation to the direction of the transfer of quanta in space.

In other words, the standard length $\underline{\lambda}$ must be the representation of the size of a spatial unity that forms the (aggregated) structure of the basic quantum fields, like the bubbles in a foam.

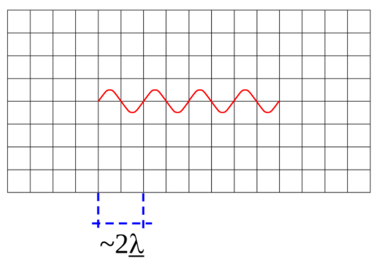

figure 01

This schematic image cannot be a surprise, because quantum fields must have a spatial structure. The only difficulty is the relation between “the foam” of the universe and Einstein’s curved space-time.

However, the cause of the difference is the scale of the observed phenomena. General relativity describes the mutual relations between macroscopic phenomena and quantum field theory describes the structure that is responsible for the emerging (the creation) of the observable phenomena in space and time. Because electromagnetic waves are everywhere in our universe we have to accept that the “bubbles” *tessellate* space, like the schematic in figure 02 shows.

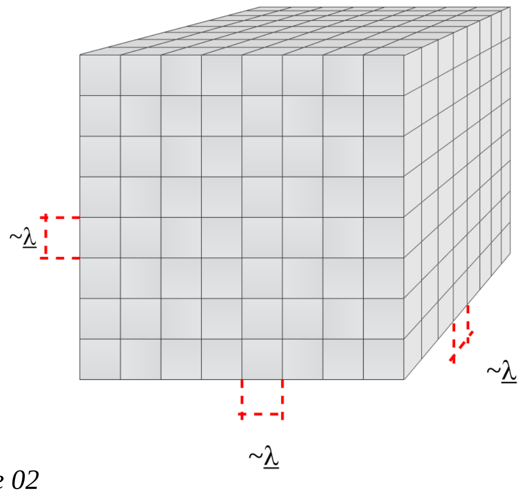

figure 02

So every volume in space consist of one or a multiple of the spatial unity that forms the basic structure of the quantum fields. Mathematically spoken, this unity is the element of a mathematical set. Because this mathematical set envelopes everything in the universe, it is the all-inclusive set that represents our universe.

Now it is only a small step to conclude that all the spatial unities together form the main structure of the basic quantum fields in our universe. In other words: the unities form a mathematical set with topological properties. Because one or more properties of the elements have to be variant, otherwise our universe exists without any internal change. So every element is a topological object that represents a homeomorphism.

The element of the mathematical set gets the character "*e*". So every volume (*V*) in the universe represents:

$$V = \mathrm{n}\, V_e$$

[n = integer (variable); V_e = volume element]

Importing the standard length in the Planck-Einstein relation has consequences. The alterations within the vector part of the basic quantum fields – *between the adjacent bubbles of the foam* – are restricted to the exchange of an amount of quantized energy that is related to Planck's constant (the scalar part of the structure of the elements is not involved in this rough concept of reality).

Besides that, within the minimal length scale phenomena cannot have *observable* properties that have a value in-between the exchange of a fixed amount of topological deformation between the elements. The pass on of quanta between adjacent elements that tessellate space (Heisenberg's uncertainty principle).

Quantum time

The transfer of quanta within the structure of the basic quantum fields is impossible without a constant velocity. All the elements tessellate space, therefore continuous change is only possible if all the changes of the elements at every single moment are synchronized otherwise quantized space will be destroyed.

Conclusion: the velocity (*c*) of the transfer of a single quantum is independent from the velocity – and the direction – of a transferred configuration of an energy concentration from which the single quantum originate.

Figure 03 shows a quantum of energy (black square). It is the smallest amount of a change of position of a fixed amount of energy transferred from one element to an adjacent element. The fixed amount of energy is directly related to Planck's constant although the actual size of an element isn't exactly known. In other words, if a quantum – a fixed amount of topological deformation – is transferred in one direction to an adjacent element (the distance = $\underline{\lambda}$) the quantum will represent a fixed part of the energy of Planck's constant.

To distinguish between the energy of Planck's constant (*h*) and the energy of the universal constant of topological deformation the latter gets the notation $\underline{h}$.

Therefore: $h = \mathrm{n}\, \underline{h}$ [n = integer (variable)].

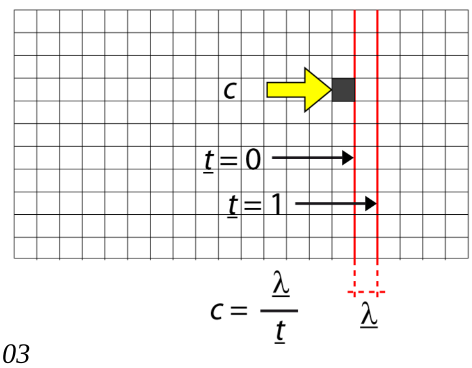

figure 03

The cause that is responsible for the pass on of topological deformation between the elements that form the structure of the universe is a property of every spatial unity (element). This property must be a constant because topological objects that tessellate space cannot change continuously without the existence of a universal property responsible for topological deformation.

Moreover, we have to accept that there is no topological deformation without a fluent transfer of a part of the invariant volume of every element. Therefore the fixed amount of energy of a quantum emerge from the synchronized mutual deformations of the elements of the all-inclusive set.

The transfer in one direction of a fixed amount of energy – a quantum – between adjacent elements of the all-inclusive set have a certain duration: length divided by velocity. Length ($\underline{\lambda}$) and velocity (c) are constants, therefore time is a constant too. So T (duration) becomes a multiple of $\underline{t}$ (underlined to express the status as a universal constant):

$$T = \mathrm{n}\,\underline{t}$$

[T = time (period); n = integer (variable); $\underline{t}$ = constant of quantum time]

If the structure of the quantum fields is composed by elements that only can transfer one quantum with the same velocity (c) during the same time ($\underline{t}$) we have to conclude that all the quanta transfer in quantized space during 1 $\underline{t}$ is conserved.

That means that equal volumes – irrespective of their position in the universe – have the same amount of single quanta transfer during identical periods of time. Therefore the total amount of quanta transfer in space is conserved and is correlated (the topological transformations are non-local because the elements tessellate space).

Finally, it shows that the conservation of energy is not a law of nature. It is the mathematical consequence of the properties of the elements of the all-inclusive set: the structure of the basic quantum fields.

Relative time

"*How can relative time emerge from the constant of time?*"

When we accelerate a clock – or a particle – we change the ratio of the direction of the local changes between the elements that create the object at that moment, because quanta transfer in quantized space is conserved.

If a phenomenon moves nearly with the speed of light – the movement is a pass on of properties between elements – most of the quanta transfer by the involved elements is "consumed" to enable this high velocity in one direction. Only a small part of the involved quanta transfer is available for the changes "inside" the clock/particle. This is the origin of the twin paradox.

General relativity

It is logically inconceivable that a variable in an equation with only constants is a variable. Therefore, it is also inconceivable that the 2 main theories in physics don't share the same concept about space and time.

General relativity describes the mutual relations of macroscopic phenomena with the help of position (space) and duration (time) in relation to the energy of observable phenomena. However, before Albert Einstein published his paper about Special Relativity in 1905 Max Planck had published the quantization of energy in 1900.

The quantization of space (n V_e), indicated by the existence of the universal constants c (speed of light), $\underline{t}$ (constant of time), $\underline{h}$ (quantum of topological deformation) and $\underline{\lambda}$ (constant of length), shows that Albert Einstein's theory of general relativity – the curvature of space as the result of gravity – is founded upon a misconception about the basic properties of space itself.

References

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* City of Amersfoort, the Netherlands
mail: phia@xs4all.nl
orcid: 0000-0002-2882-420X