

A new phenomenology of force, mass and energy

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Abstract

Until now in modern physics energy, force and mass have been considered separate and distinct entities, the various forces of nature have not been linked into a single, coherent theory, and general relativity shows inconsistencies with some mechanical phenomena quantum. The purpose of this article is to show that energy, force and mass are a single entity which I will refer to as “energy force” furthermore general relativity can harmonize with quantum mechanics in a single theory but needs to be expanded. To arrive at this result, I used recent studies carried out on some phenomena of quantum mechanics, in particular on the existence, nature and characteristics of "quantum entanglement". The results obtained from the observation and study of "quantum entanglement" show that energy, force and mass are one and that light is to be considered not as an entity that moves with a constant speed but as a accelerating variable entity.

Introduction

Entanglement or quantum correlation is a quantum phenomenon, not reducible to classical mechanics, for which, in the condition, foreseen by the superposition principle of quantum mechanics, in which two or more physical systems (typically two particles) form a system whose quantum state is represented by a combination of their individual states, the measurement of an observable of a system (subsystem) also simultaneously determines the value of the same observable of the others. Since the state of quantum superposition is independent of a spatial separation of such systems (subsystems), entanglement implies in a counterintuitive way the presence of distant correlations between them and, consequently, the non-local character of the physical reality. According to quantum mechanics it is possible to create a system consisting of two particles characterized by certain global values of some observables. This implies that the value of one of these measured on a single particle (a typical example is spin) instantly influences the corresponding value of the other, which will be such as to maintain the initial global value, according to the conservation law. This remains true even in the experimentally possible case that the two particles are spaced apart, without any spatial limit. It should be noted that the measurement process relating to the single particle is subject to the quantum rules of probability. In practice, two particles can be obtained which, according to theory, should possess this characteristic, by making them interact appropriately or by acquiring them from a natural process that originates in the same instant (for example a single radioactive decay), so that they are described by a state defined global quantum, while individually maintaining an indefinite character until a measurement is performed. I will not dwell on the mathematical formalism as many studies carried out with photons are already known, neutrinos and electrons have demonstrated the existence of quantum entanglement. [1-3]

The Energy Force

The existence of quantum entanglement is indisputable however the phenomenon does not agree with the theory of relativity which, among its pillars, has the constant of the speed of light at about 300,000 km/s. We know that the formula for Energy is:

$$E = mc^2$$

Where E=energy, m=mass, c=constant (speed of light in vacuum). The constancy of the speed of light in a vacuum does not agree with the property of simultaneity present in quantum entanglement. Postulating that light is an accelerating entity and not an entity moving at a constant speed resolves this inconsistency.

Called "c t" the way of the light speed in one second, set " $ct = 3 \times 10^8$ [m]" that become a constant with the unit [m] and rewrite the energy formula:

$$E = m a c t$$

Where E=energy, m=mass, a=acceleration (acceleration of light), $ct = 3 \times 10^8$ [m]

Now the simultaneity present in the phenomenon of quantum entanglement is explained.

If it is true that:

$$E = m a c t$$

You get:

$$m = E / a c t$$

Looking at the new Energy formula:

$$E = m a c t$$

We realize that the Energy formula is identical to that of the Force where:

$$F = ma$$

Where F=force, m=mass, a=acceleration

Consequently we have:

$$m = F / a$$

Since $m=m$ then:

$$F / a = E / a c t$$

Therefore we get:

$$F = E / (3 \times 10^8 m) = ma$$

This means that by expanding the theory of general relativity and considering light as an accelerating entity it is possible to conclude that force is equal to energy and mass, therefore force, energy and mass are a single entity which I will here call "energy force".

To rewrite the equations of relativity considering light as a variable acceleration, we need to modify the basic equations of both special and general relativity to include this new characteristic of light. Since recent discoveries suggest that light is no longer a constant but subject to variable acceleration, we must adapt the equations to reflect this dynamic.

This modification implies that the total energy of an object depends not only on its rest mass and momentum but also on the acceleration of light interacting with it.

General Relativity with Light as Variable Acceleration:

In Einstein's field equations, the equation becomes more complex, with the addition of terms representing the interaction between light and gravity:

1. Einstein Field Equation with Light-Matter Coupling:

$$R_{\mu\nu} - 1/2 R g_{\mu\nu} + \Lambda g_{\mu\nu} = 8\pi G/c^4 T_{\mu\nu} + 1/c^2 E_{\mu\nu}$$

where $E_{\mu\nu}$ represents the energy-momentum tensor associated with light and accounts for the variable acceleration of light;

2. Equation of Motion for Light:

$$\nabla^\mu F_{\mu\nu} = 1/c J_\nu$$

where $F_{\mu\nu}$ is the electromagnetic tensor, J_ν is the current associated with light, and ∇^μ represents the covariant derivative;

3. Conservation Equation for Energy-Momentum:

$$\nabla_\mu T^{\mu\nu} = E^{\mu\nu}$$

where $T^{\mu\nu}$ is the total energy-momentum tensor and $E^{\mu\nu}$ is the energy-momentum tensor associated with light.

Results

- There is an equivalence between energy, mass and force which from now on will be considered as a single entity called "energy force";
- The phenomenology of energy- force confirms the correctness of the general and restricted theory of relativity which, however, are limited because they describe a particular case of the motion of light, i.e. the one in which it moves at a constant speed, not taking into account the more general case in which light is an accelerating variable entity;
- Quantum entanglement represents an empirical demonstration of light as an accelerating variable entity and not as an entity capable of moving only with constant speed;

Verification Experiment

An experiment that could demonstrate that light undergoes variable acceleration could be based on the phenomenon of light aberration.

Light aberration is a phenomenon observed when the Earth moves through space while light travels through the vacuum.

This movement of the Earth can influence the angle under which we observe light from a distant star, creating an apparent deviation in the star's apparent position.

The experiment could be structured as follows:

1. Place a telescope on a rotating mount that allows for changing the observation angle.
2. Locate a distant star and record its apparent position in the sky using the telescope.
3. Repeat the observations at different times of the year when the Earth is in different positions along its orbit.
4. Measure the variations in the angle under which the star appears in the telescope.
5. Compare these variations with predictions based on the theory of light aberration, which takes into account the Earth's orbital motion and the speed of light.

If the acceleration of light were uniform, there would be no deviation in the observation angle of the star. However, if the acceleration of light were variable, discrepancies between theoretical predictions and actual measurements of the angle of light aberration might be observed.

To increase the accuracy of the experiment, it would be necessary to control and correct for any factors that could affect the measurements, such as the effect of atmospheric distortion or other environmental factors. Additionally, the use of precision instruments and sophisticated measurement techniques would be essential for obtaining reliable results.

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References

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