

Do Gravitational Waves Exist?

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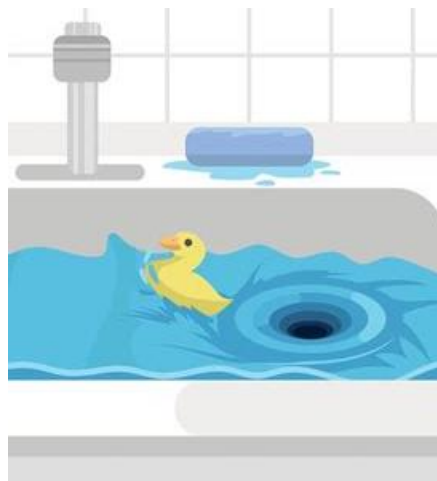
“Beware of his false knowledge; it is more dangerous than ignorance”.
- George Bernard Shaw

Introduction

This article covers not only gravitational waves but touches a little the phenomenon of the waves in any field.

The fields are pure mathematical construction. The whole thing was started by Isaac Newton with his law of gravitation. The physical mechanism of gravity was and is unknown and what Newton did, he suggested mathematical formulas just for calculation purposes.

A lot of battles happened in the past days physics around Newton's mathematical approach. Advocates of Newton telling that since mathematical description gives us the correct mechanism for calculation, nobody cares about underlying physical principles. I don't want to touch this philosophical subject in such short article, but would like to give you brief example.



Imagine toy in the bathtub whirlpool. The toy circling around the hole and according to Newton, circular trajectory means central force of attraction between hole and toy. This Toy-Bathtub-Hole (TBH) force is inversely proportional to the radius squared. Following a little bit further we could introduce TBH field, TBH potential and TBH universal constant. Almost forgot – quantum physics requires particles, the force carriers and we should invent some.

The Waves

The waves require a media, this is just common sense. “What is waving?” – we usually ask.

The concept of fields do not require any media for waves, the good example are electromagnetic waves in vacuum. Any person hear about EM waves through the whole process of education. And moreover – the radio works! How it is possible in such circumstances not to believe in electromagnetic waves?

Let me remind how regular waves work. Waves on guitar string for example. The motion starts with finger, then the part of the string going up, but the neighboring parts of the string pulling this piece down due to elastic force. This is it! Elastic force is a necessary component of any oscillating system. Without returning force no oscillations and no waves are even possible.

EM, Gravitational and Any Other Fields

Now assume there is gravitational or electromagnetic wave in the vacuum. Some property in some point of space (let’s say electric potential) starts to grow. We know that the waves are all sine waves. This electric potential grow and grow and grow...

Also we know from physics that waves do not interact with waves, only with material bodies. Why suddenly this potential slowing down and stars to diminish? There are no material bodies around, just waves. Who or what pulling it down?

There is no answer to this question in the framework of modern physics. No returning force for such waves exist. That is the main objection for existence any waves in the fields.

Growing electric field will grow forever without returning force!

For those who fluent with mathematics I can suggest [the article](#) on Maxwell’s equations for electromagnetic waves. It was found that the sine is not the only solution for this equations, but almost any function satisfies to the equations, for example exponential function.

Gravitation Waves Observation

The absence of returning force in case of gravitational waves sounds reasonable only in the framework of classical physics.

Switching to Einstein’s general relativity we are canceling gravitational field. This is it – gravitational field does not exists in this new world. Gravitation was transformed to something else, to the curvature of the space-time fabric, whatever it is. The gravitational waves now are ripples of the space-time curvature.

Gravitational waves were directly “observed” in 2015 on LIGO apparatus. LIGO is just very long interferometer for distance measurements between two mirrors. The mirrors are pretty well protected from the motion induced by Earth factors such as earthquakes.

When changes in length from external factors are prohibited by design, what else could be the cause of such changes? Gravitational waves of course!

If the distances in space-time fabric are affected by gravitational waves, how those changes could possibly be detected? The point is that all our instruments exist in the same fabric of space-time. We don't have any alien's instruments which are outside of our fabric.

Good analogy is measuring of thermal expansion of plastic using plastic ruler made out of the same material.

[Here](#) is the illustration of gravity wave detection. Gravitational wave distorts space-time along with everything immersed into it.

Space-Time Curvature

The existence of curved space-time is under huge doubt. Let me throw some light on topic.

The science states that space is curved when Pythagorean theorem not holds. Or in simple words our ordinary 3D space is curved when measured length between two points is not equals to calculated length:

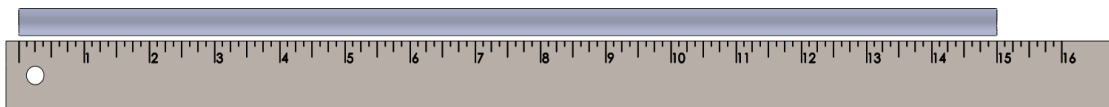
$$\Delta x^2 + \Delta y^2 + \Delta z^2 \neq L^2$$

Quite difficult to understand what this inequation means in our 3D world. Understanding of this inequality in case of four-dimensional space-time is well above human brain ability.

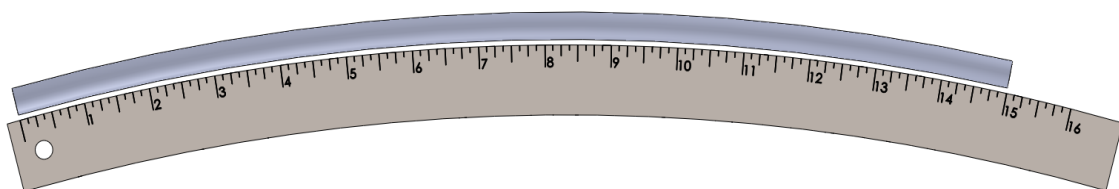
I am going to downsize the problem to one-dimensional world. One-dimensional world is just a line with only one coordinate possible and the above inequation degenerate to:

$$\Delta x \neq L$$

Now let's measure some distance in our world:

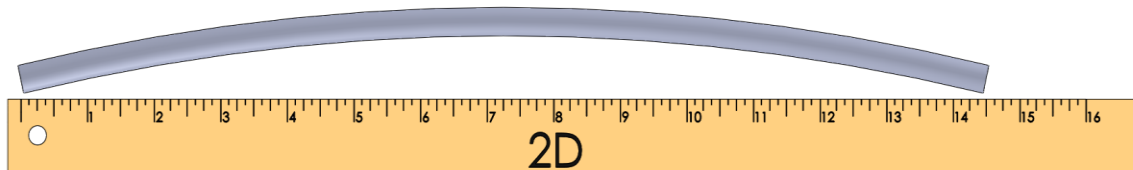


What about the same measurement in the world with curvature? Here it is:



It appears that our ruler belongs to our world. The ruler only exists inside our one-dimensional line, this is one-dimensional world, remember? Nothing from it exist outside of it. Of course the ruler was bended along with bended world! The length remains the same and Pythagorean theorem will always be true.

There is only one way to understand that our world was bended – buy somewhere magical two-dimensional ruler which is not a part of our one-dimensional world, but extends into second dimension:



As you can see the bending of one dimensional world could not be detected from inside the world. Or we can say that the bending of one-dimensional world extends into second dimension!

The same applies to the world around us. In order to detect curvature ripples in four-dimensional space-time, five-dimensional instrument required. Just curious about make and model.

Do Gravitational Waves Exist? Not in our world.