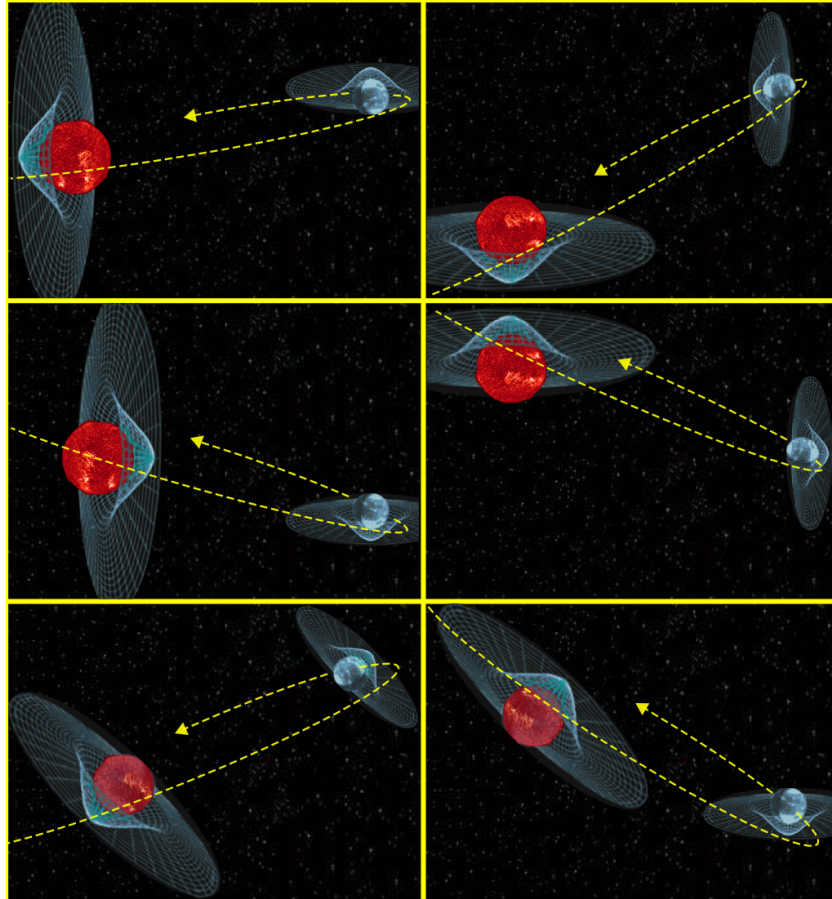


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# Spacetime Curvature Paradox Essay

短論時空曲率的詭謎

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Infinite Curvature Vectors of Spacetime Paradox

ISBN 978-957-43-4242-6



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Edition: 2016(01)-preview  
2016/12

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## Abstract

What happening in the universe is played out by three fundamentals, matter, energy, and space. Nothing more and nothing less. All three fundamental elements are able to return to their original properties in perfect recycle. However only space can be considered absolutely perfect. It is the only element remains at it's original location. Matter and energy, on the other hand, are perfectly recyclable but unlikely back to the original location. The absolute and related locations of matters will not be the same if ever.

Space is in our hands and all around us. We have learned to manipulate matter and energy since our first existence on Earth, but never space. Folding a pizza or a sheet of paper does not fold the space. Moving what is in your hands does not move the space. Even vacuum can not exist without space. We can simulate vacuum in a sealed chamber. We only isolate matter, but space always be in it with vacuum. Vacuum disappears as soon as the chamber is open but never space. Space is the absolute complement of the physical universe. It can not be disturbed, otherwise there would be no peace in the whole universe.

We see motion all around us, but never time. Counting clock ticks from sunrise to sunset is not time, but the reference of related motion of the Sun and the Earth. Time is the artificial reference of the progress of actions. Nature does not act with time. We can redefine the Universal Time Coordinated, second, minute, or any reference of action, but never time. Time is only our illusion created by actions. Nevertheless, I don't believe curvature of spacetime can exist since it would cause desynchronization, hence the lost concordance of mass and energy of the universe.

Analogous to chemical experiments in submerged laboratory, all experiments are submerged in the particle sea. Radiations, particles, temperature, pressure, magnetic fields, passing neutrinos, and so forth. Universe is filled with knowns and unknowns that can not be isolated from our observations and experiments. A minute variation of clock on board of the International Space Station does not mean time has changed. Few parts per hundred, thousand, million, or billion may not be significant enough in an experiment. We can not look too hard for things we wish to find. It is not necessary the truth is not there. It could be what we choose to believe. We can always find the variations of clock readings with better technology, however, it stays independent of time and the progress of nature events.

Our observation is the information of structure and action of detectable matter. It shows the nature of matter, but not the direct observation of space or time. Nevertheless, space and time can not go together. Space has existence, time has not. Space is absolutely recyclable, never time. And, space is fundamental, it is independent from mass, energy, and everything else. Are we confused by looking too hard?

## Contents

<b>Abstract</b>	<b>i</b>
<b>Contents</b>	<b>ii</b>
<b>List of Figures</b>	<b>ii</b>
<b>1 Introduction</b>	<b>1</b>
<b>2 Space</b>	<b>1</b>
2.1 Space, Mass, and Force . . . . .	2
2.2 Displacement of Space Paradox . . . . .	2
2.3 Expansion of Space Paradox . . . . .	3
<b>3 Gravity</b>	<b>4</b>
<b>4 Spacetime Curvature Paradox</b>	<b>5</b>
<b>5 Independence and Significance of Measurements</b>	<b>5</b>
<b>6 Summary</b>	<b>6</b>
<b>References</b>	<b>7</b>

## List of Figures

1 Free Fall in Vacuum Chamber . . . . .	2
2 Shifting Vacuum in Zero Gravity Field . . . . .	3
3 Vacuum Chamber in Zero Gravity Animation . . . . .	3
4 Expanding Vacuum in Zero Gravity Field . . . . .	3
5 Vacuum Cylinder in Zero Gravity Animation . . . . .	4
6 Falling body experiment, Brian Cox visits the world's biggest vacuum chamber - Human Universe Episode 4 Preview - BBC Two . . . . .	4
7 Slow Motion Gravity Shown By Inclined Plane . . . . .	4
8 Slow Motion Attraction Shown By Magnetic Putty, YouTube user: Steve Bartlett . . . . .	4
9 Infinite Curvature Vectors of Spacetime Paradox . . . . .	5

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# 1 Introduction

What is happening in the universe is played out by three fundamentals, matter, energy, and space. Nothing more and nothing less. All three fundamental elements are able to return to their original properties in perfect recycle. However only space can be considered absolutely perfect. It is the only element remains at its original location. Matter and energy, on the other hand, are perfectly recyclable but unlikely back to the original location. The related locations of matters will not be the same if ever.

Space is always here with us in our hands. We can manipulate anything in our hands but never space. Folding a pizza or a sheet of paper does not fold the space. Moving what is in your hands does not move the space. Even vacuum can not exist without space. We can simulate vacuum in a sealed chamber. We only isolate matter, but space always be in it with vacuum. Vacuum disappears as soon as the chamber is open but never space.

We see motion all around us, but never time. Counting clock ticks from sunrise to sunset is not time, but the reference of related motion of the Sun and the Earth. Time is the artificial reference of the progress of actions. Nature does not act with time. We can redefine the Universal Time Coordinated, second, minute, or any reference of action, but never time. Time is only our illusion created by actions. Clock can vary, but it is independent of time and actions. We can't suppose the expansion or contraction of a yard stick meant the space has changed.

Nevertheless, I don't believe curvature of spacetime can exist since it would cause desynchronization, hence the lost concordance of mass and energy of the universe.

## 2 Space

Galaxies are very far away, but space is right here in our hands and everywhere around. However, it's impossible to bent, stretch, compress, or doing anything with it. Bending a sheet of paper or pizza has nothing to do with the space. Rising ball of dough will not carry chocolate chips if they are not attached, or no friction between dough and chocolate chips. Blowing up a balloon does not make the space larger or smaller. Neither space has changed when the balloon is popped. Shipping countless sealed or unsealed containers from Shanghai to Los Angeles can never take the space from China to California.

Logically, we can not detect vacuum, or emptiness. We can only detect the absence of detectable. Absence of detectable is not absolutely equal to emptiness. Even if the best telescopes only see the darkness in a region of space, it is not absolutely empty or the edge of the space is reached. Darkness is not emptiness. Absence of matter is not absence of space. We can not detect the boundary of space. Neither can we detect the surface or shape of the space that is right in our hands. The same logics that we can not detect the absence of space. It can only be considered infinite. We have learned to manipulate matter and energy since our first existence on Earth, never space. It is the absolute complement of the physical universe. To me. it is impossible to subscribe the idea of bending space. It can not be disturbed, otherwise there would be no peace in universe.

Even it is impossible to study space hand-on. However, there is vacuum that shares many properties of

space. Fortunately, we can create and shape vacuum to an extent. By isolating matter and energy, we can create man-made vacuum that is observable. When matter and energy are absent, the important nature of space would surface.

## 2.1 Space, Mass, and Force

40 Here, we repeat the famous Galileo's experiment with a ball and a dandelion seed free-falling in a vacuum chamber, Figure 1. It shows, in gravity field, falling objects would fall with uniform acceleration in vacuum, regardless of their shape, size, or compositions. Or, gravitational acceleration is independent of mass, shape, size, surface, and distance. The truth is, a simple experiment since centuries ago tells more than just gravity.

45 Even the ball and the seed have structure and surface, and both are capable of surface interactions. However, vacuum would not disrupt the fall. The ball and the seed will descend in identical acceleration and land at the same time. It shows the truth that the vacuum has no friction. It also shows the reverse truth that the ball and the seed (mass) and the motion of mass can not disturb vacuum. Here we summarize the properties of vacuum:

- 50 • It has no mass,
- contains no energy,
- actionless or absolute zero,
- frictionless or zero viscosity, and
- incapable of any interaction.

55 The nature of vacuum basically is the property of absence, or emptiness. The fact is, even vacuum can not exist without space. Nevertheless, space also posses the property of absence. It also shows the fact that the space would not alter the fall, it is also frictionless, and neither does it have surface and it is unable to interact. We can consider space is analogous to an infinite vacuum, and vacuum the window to view the nature of space.

60 Additionally, all invisible stuffs inside the chamber, *e.g.* hypothesized dark matter/energy (I don't see why not, since it is so much of them.) would have to be independent. Anything inside the chamber will not disrupt the fall. In other words, space, vacuum, invisibles, and dark matter/energy, if existed, are independent of the motion of the ball and seed (mass). Reversely, mass and motion of mass will no disturb space and vacuum. Note that it is gravity powers the fall. It also means that *gravity can wave mass, but vacuum and space can not be disturbed by gravity*. In light of this, *what really are gravitational wave and geodetic effect?*

## 65 2.2 Displacement of Space Paradox

Suppose we do the same experiment in zero gravity field by shifting the chamber, as depicted in Figure 2:

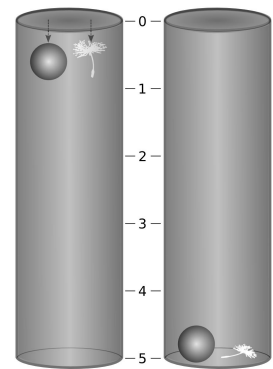


Figure 1: Free Fall in Vacuum Chamber

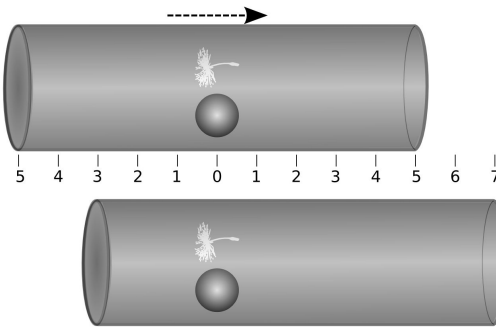


Figure 2: Shifting Vacuum in Zero Gravity Field

Here, vacuum has shifted with the chamber, however, the result can only be the same as in gravity field, the ball and the seed would not move along. The motion of vacuum would not disturb the ball and the seed as long as there is no physical contact. I would say neither the vacuum nor the space will carry objects, and space remains independent of all objects and actions, even the displacement of vacuum. The argument of dark matter/energy also applied here.

Figure 3 is an animated illustration. Please note that some PDF viewer might not display it properly.



Figure 3: Vacuum Chamber in Zero Gravity Animation

## 2.3 Expansion of Space Paradox

Next, suppose we have a vacuum cylinder equipped with piston, as depicted in Figure 4.

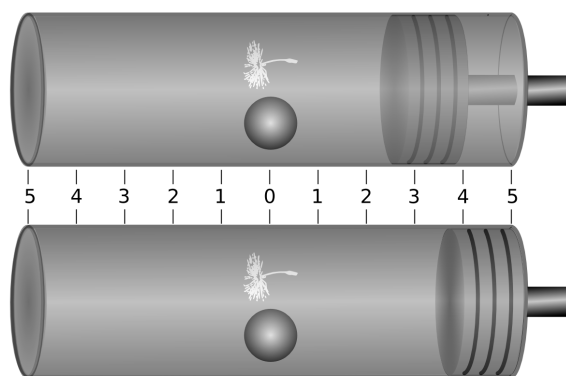


Figure 4: Expanding Vacuum in Zero Gravity Field

Here we can compress or expand the volume of vacuum with this device. However, neither the compression nor the expansion of vacuum would displace the ball and the seed, as long as the piston does not come in contact with the ball and the seed. In this experiment, I would say neither space is capable of displace object, nor the space has been compressed or expanded. The same argument of dark matter/energy also applied.

Figure 5 is an animated illustration. Please note that some PDF viewer might not display it properly.



Figure 5: Vacuum Cylinder in Zero Gravity Animation

### 3 Gravity

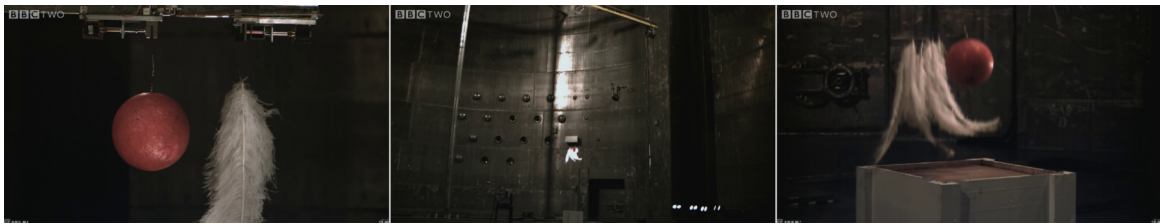


Figure 6: Falling body experiment, Brian Cox visits the world's biggest vacuum chamber - Human Universe Episode 4 Preview - BBC Two

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All falling body experiments show one overlooked fact,

*gravitational acceleration is independent of mass, shape, size, surface, and distance.*

Contrarily,

*attracting acceleration is dependent on mass, shape, size, surface, and distance.*

95

Therefore,

***"gravity is not attraction."***

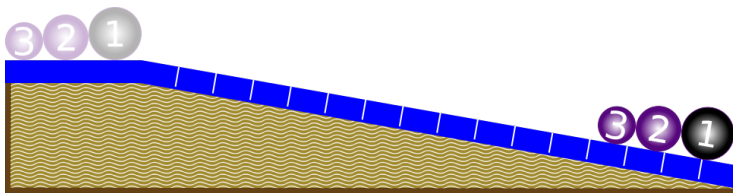


Figure 7: Slow Motion Gravity Shown By Inclined Plane

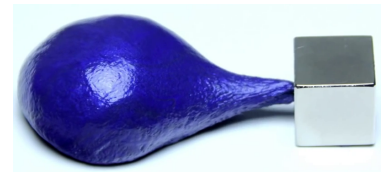


Figure 8: Slow Motion Attraction Shown By Magnetic Putty, YouTube user: Steve Bartlett

The experiment in Figure 6 tells more than just gravity. Since space is inside chamber. It also shows the truth,

*the vacuum and space do not disrupt the fall,*

and reverse truth,

100

*the ball and feather (both mass) and the motion of mass do not disturb vacuum and space.*

Note that it is gravity powers the fall. It also shows the truth,

*gravity can act on mass, but vacuum and space can not be disturbed by gravity.*

In light of this, what really are *gravitational wave* and *geodetic effect*?



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## 105 4 Spacetime Curvature Paradox

First of all, can geodetic effect[1] explain gravity in falling body experiments?

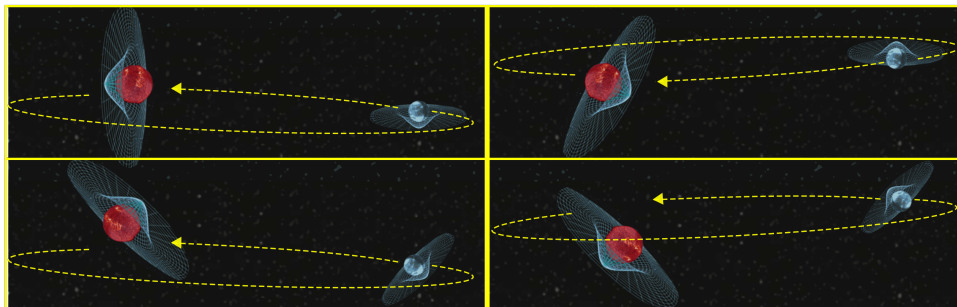


Figure 9: Infinite Curvature Vectors of Spacetime Paradox

As depicted in Figure 9, I don't see how two-dimensional conception of Geodetic Effect can work in three-dimensional space. In space, it could have infinite vectors of up, down, left, right, and everything in between, be carried along with an orbiting body, if such vector existed. There is no way of predicting which gravity vector will take effect. Different bodies would not fall in identical rate in gravity field if there were curvature of spacetime. If it is geodetic effect keeping Earth and Moon from spiraling toward the Sun, wouldn't curvature of spacetime be significant and detectable during solar and lunar eclipses? Hot solar atmosphere could create observable mirage during solar eclipse. However, light bending of hot tin-roof is completely irrelevant to space or time.

To me, gravity does not bend space. Falling body experiments had shown that vacuum and space can not be disturbed by gravity. Gravity can act on clock (mass), but never time. Besides, space and time can not go together. Space has natural existence, time has not but an artificial measurement. Space is absolutely recyclable, but time can never be recycled. And, space is fundamental, it is independent of mass, energy, and everything else. Due to it's paradoxes, neither geodetic effect can explain the formation and operation of star system, nor the gravity force in our daily life and falling body experiments.

## 5 Independence and Significance of Measurements

We use measurements to understand the nature events in the universe. These artificial references do not exist in nature. We use meter to measure the distance, clock ticks to compare the actions, volume of water to tell the difference of dimensions and gravity force (weight), and many more. However, all standards of measurement are not absolute. All measurements are approximation. Even the precision is better than our expectation, measurement is independent of event. Variations of measurement can not be confused with the conditions of nature events.

Analogous to chemical experiments in submerged laboratory, all experiments are submerged in the particle sea. Radiations, particles, temperature, pressure, magnetic fields, passing neutrinos, and so forth. Universe is filled with knowns and unknowns that can not be isolated from our observations and experiments. A minute variation of clock on board of the International Space Station does not mean time has changed. Few parts per

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hundred, thousand, million, or billion may not be significant enough in an experiment. We can not look too  
135 hard for things we wish to find. It is not necessary the truth is not there. It could be what we choose to believe.  
We can always find the variations of clock readings with better technology, however, it stays independent of  
time and the progress of nature events.

I believe any measurement has to be significant. It has to be the principle of all experiments and mea-  
surements that is short of significance. Most of all, any interpretation shall not be illogical, paradoxical,  
140 mind-boggling, or specious of any kind.

## 6 Summary

Space is everywhere with us. It's in the hands of scientists. However, it's impossible to bent, stretch, compress,  
or doing anything with it. Expansion of the space would intertwine with many paradoxes that is beyond com-  
prehension. We have learned to manipulating matter and energy since our first existence on Earth, however,  
145 never space. Space is fundamental, it is independent from mass, energy, and everything else. Nothing can  
interact with space, even space itself. [3]

On the other hand, time is only the reference of actions measured by other actions, *e.g.* dripping water,  
burning candle, sunrise, moonset, atomic oscillation, etc. It is the illusion created by the progression of the  
universe.

150 So is the reference of size measured by the length of a yardstick, or other measurements. They don't exist in  
natural. They are information, not the participants, and can not interact with (or alter) the universe. Neither  
can we suppose the expansion or contraction of a yardstick meant the space has changed, nor the variation of  
clock meant time has altered. Our observation is the information of detectable matter and action. It shows the  
natures of matter and action. It is not the direct observation of space or time.

155 Nevertheless, space and time can not go together. Space has natural existence, time has not but an artificial  
measurement. Space is absolutely recyclable, never time. And, space is fundamental, it is independent of  
mass, energy, and everything else. Haven't we confused by looking too hard?

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170

