

A Law of Projection in a Possible Universe

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ABSTRACT

Can we imagine a world without lights? Is the world without lights a total darkness? Do we still need eyes to see if there are no lights? In this paper, I propose a possible world without lights, a new world that instead has a new physical law : a law of projection. Firstly I show a problem of Coulomb's law in Electromagnetics, which is the reason I invent the law of projection to replace the Electromagnetics(light). Secondly, I propose the projection law and then discuss the instantaneousness property of this physical law. Next, I make a new eye for the projection law to "see" the environment and create a new miniature model of the surrounding world inside the new brain. The major difference between the lights and the projection law is that the brain stores a 2D image for lights while the new brain stores a 3D model of the world for projection law. By this new model, the edge detection algorithm in computer vision will need to be modified for the new miniature reality. Then I discuss the functions of arts and communications that should be modified by the projection law. And lastly I list the problems of the projection law as a whole.

Keywords: Law, Possible, Projection, Universe, World.

1. PROBLEM OF LIGHT : ELECTROMAGNETICS[1]

By Coulomb's Law[2] in Electromagnetics, a collision of an electron and a proton will emit infinite energy.

$$F = \frac{kQ_1Q_2}{r^2} = - \frac{kq^2}{r^2}$$

$$V = \frac{kq^2}{r}$$

$$r=0 \rightarrow V = \infty$$

So we will need a new law in replacement of the law of light. In this paper I propose a new law "A Law of Projection" to replace the law of light in a possible universe.

2. THE PROJECTION LAW

1. particles being copied (P)

P is any particle that has property color(r,g,b).

2. particles copied to (Q)

Q is a special particle that P is projected to. It has 2 attributes is Vacuum and color(r,g,b).

3. projector front particle (A)

A is in the front of the projector.

4. projector back particle (B)

B is at the back of the projector.

5. The law of projection

P A--B Q

The positions must satisfy the projection equation

$$\overline{PA} * \overline{AB} = \overline{BQ}$$

If P is a vacuum point, then Q's is Vacuum property is true, else Q's color(r,g,b)= P's color(r,g,b).

Example 1 : P's color is (255,0,0), $\overline{PA}=10$,

$$\overline{AB}=0.1$$

$$\Rightarrow \overline{BQ}=1 \quad \text{Q's color is (255,0,0)}$$

Example 2 : P is a vacuum point, $\overline{PA}=5$,

$$\overline{AB}=0.3$$

$$\Rightarrow \overline{BQ}=1.5 \quad \text{Q's is Vacuum is true}$$

Example 3 : P's color is (255,255,255),

$$\overline{PA}=15, \quad \overline{AB}=0$$

$$\Rightarrow \overline{BQ}=0 \quad \text{Because B is not a kind of particle Q, so no projection is made.}$$

3. INSTANTANEOUSNESS

By the law of Newton's gravitation[3],

$$F = - \frac{GM_1M_2}{r^2}$$

the force F is changed instantaneously when r changes. So as a physical law, it is much faster than the speed of light.

The projection law, as a physical law, has the instantaneousness property just like Newton's gravitation law. If particles P Q A B are positioned correctly, then Q must have the same color attribute of P at the same time. So the projection law changes

the information much faster than the way the old eyes receive lights.

4. MODEL OF THE WORLD : EYES AND LIGHTS v.s. PROJECTION LAW

With the advance of the technology, we have X-Ray[4] and MRI[5] which can see through 3D structures. So the lights(Electromagnetics) actually can penetrate the surfaces of objects and present the 3D structures. Therefore it is all due to the visual processing of our brain that can only deal with a 2D image at a time. The major difference between the lights and the projection law is that the old brain stores a 2D image for lights while the new brain stores a 3D model of the world for projection law. So in the following, I will propose a new model of brain vision with 3D miniature of the world.

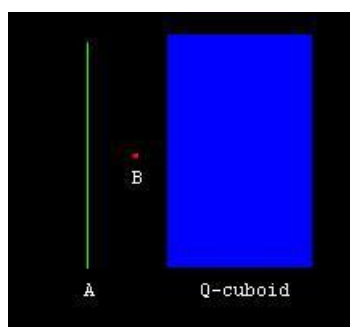
1. Function of seeing the environment

The new brain stores a 3D miniature of world in Q particles which is a 3D cuboid[6] inside the brain, but shown as a rectangle on this 2D paper. In front of the Q particles, there are projectors A-B in the following 3 arrangements.

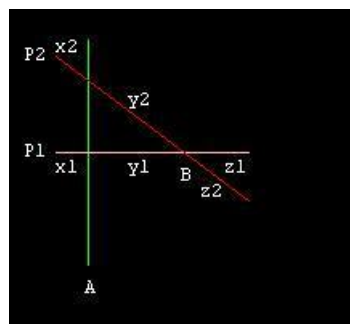
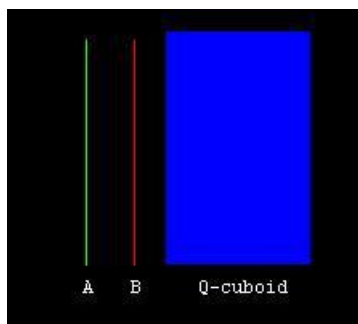
2. Arrangements of projector particles

1. Three arrangements of the new eye!

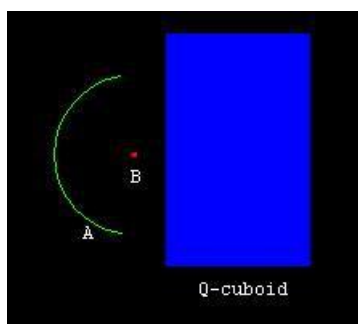
Arrangement 1



Arrangement 2



Arrangement 3



Proof :

By projection law, we have

$$x_1 * y_1 = z_1 \quad (1)$$

$$x_2 * y_2 = z_2 \quad (2)$$

Because the following SINA's have the same angle, we have

$$\frac{y_1}{y_2} = \frac{z_1}{z_2} = \frac{x_1 + y_1}{x_2 + y_2} = t$$

$$(3) \quad (4) \quad (5)$$

$$\text{By (3), } y_1 = y_2 * t \quad (6)$$

$$\text{By (4), } z_1 = z_2 * t \quad (7)$$

$$\text{By (5), } x_1 + y_1 = (x_2 + y_2) * t \quad (8)$$

$$\text{By (6) and (8), } x_1 + y_2 * t = x_2 * t + y_2 * t \quad (9)$$

$$\text{Reducing (9), } x_1 = x_2 * t \quad (10)$$

$$\text{By (1),(10),(6),(7), } x_2 y_2 t^2 = z_2 t \quad (11)$$

$$\text{Reducing (11), } z_2 = x_2 y_2 t \quad (12)$$

$$\text{By (2), we have } z_2 = x_2 y_2 \quad (13)$$

$$\text{Dividing (12) by (13), we have } 1 = t \quad (14)$$

$$\text{By (10),(3),(4),(14), } x_1 = x_2, y_1 = y_2, z_1 = z_2 \quad (15)$$

So (15) contradicts with $P_1 \neq P_2$, i.e.

$$x_1 \neq x_2 \text{ or } y_1 \neq y_2 \text{ or } z_1 \neq z_2$$

Therefore we end the proof.

Where Q-cuboid is a cuboid containing Q particles. And A-solid line is a plane containing A particles.

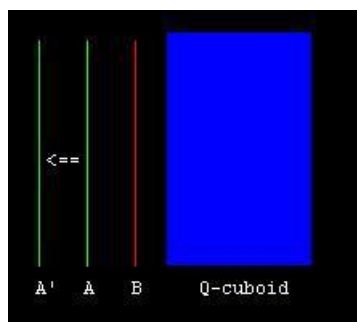
The following is the information about each arrangement.

1. Arrangement 1 will get a distorted model of reality.
2. Arrangement 2 is sound but can only watch in front.
3. Arrangement 3 is sound and has more angles, but is an inverse model.

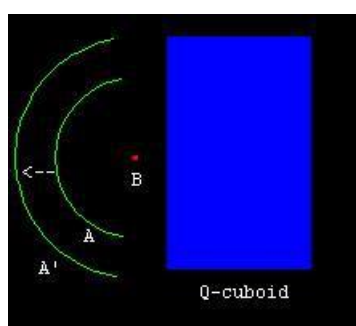
Here I will show that Arrangement 1 will get a distorted model of reality. We will do this by showing that two different points P1 and P2 which have same distance in front will be projected to points of different depths. We prove this by assuming that the premise is true, then show that it will get a contradiction.

4. Change of projector length \overline{AB} in the new eye for arrangements 2 and 3.

Arrangement 2



Arrangement 3



In this way, the new eye can change its eye-sight by moving the A line or A circle. The less of the projector length \overline{AB} , the farther it can see with larger \overline{PA} .

5. COMPUTER VISION PROBLEM : SEGMENT OBJECTS FROM BACKGROUND

The goal in computer vision is to identify objects inside an image. Since now the law of light is replaced by the law of projection, the image which is 2D object should be replaced by a vision cuboid which is a 3D object.

To identify the objects in the vision cuboid, we need to firstly segment the objects from their background. This is a difficulty work in 2D image for sometimes the objects' color is similar to backgrounds' color. But now it will be much easier in 3D vision cuboid

because there are mostly vacuums between objects and their backgrounds. We can find the edges of objects by taking advantages of the isVacuum property of each pixel Q in the 3D vision cuboid.

In the following I present an algorithm for edge detection by isVacuum property of Q pixels. This algorithm decides if the pixel Q is an edge point or not, and the result is stored in the boolean variable "isEdge".

```
isEdge=false;
for each pixel E in the surrounding pixels of pixel Q
{
    if(E.isVacuum != Q.isVacuum), then {
        isEdge=true;
        break loop;
    }
}
```

6. ARTS

1. TV, Movie : 2D to 3D

We have enjoyed the conventional TV and movies with 2D images. Though there are 3D movie invented nowadays, our brain can still deal with 2D images, and also the 3D effects are only in some elements of the movie, not really a 3D structure of most of the movie, such as the background. Since we now have a new model of 3D vision in a the new brain, we will hope that the TV and Movie change from 2D to real 3D. i.e. the TV or Movie will become a 3D cuboid that plays real 3D programs and movies. This is not only the new perception for human beings, but also a new challenge for engineering to make 3D TV and Movie.

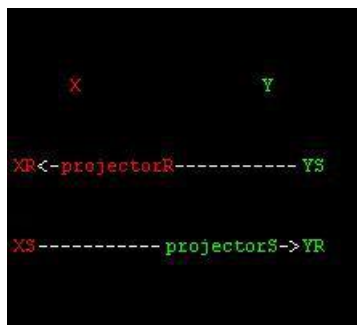
2. Opera show : 3D to 3D

In fact, we already have 3D shows like Opera

performing. And we have enjoyed them from our 2D visual processing. Hence by the new brain, we can now enjoy the 3D drama with new 3D visual processing through the new eyes. The unresolved engineering problem is how to record the Opera with 3D space sequences, especially now we already have the tools of projectors.

7. COMMUNICATION

Consider the communication between 2 sites X and Y. X has one tape XR for receiving, and a projector R inside X to project Y's tape YS for sending to X's tape XR. Y similarly has one tape YR for receiving, and a projector S inside Y to project X's tape XS for sending to Y's tape YR.



Note that the law of projection has the property of instantaneousness, so the writing at XS and the receiving at YR are at the same time. Therefore clocks, synchronization and protocols are required to establish the communication.

Also note that, the signal transmitted between X and Y can be 1D, 2D or 3D, because the projectors of the new eye arrangement are inherently capable of projecting 3D structures.

8. PROBLEMS

1. Problem of privacy

If I don't like to show strangers about my house interior, the lights and hence the eye sights are blocked by the walls of my house. However, without the lights, the projection law allows anyone to see the interior of my house because the projection law is not blocked by walls. Therefore we have the problem of privacy if we are committed to the projection law.

There are two plausible solutions to this problem. The first solution states that in projection law, only the color property of matters is seen, the other properties are unknown to the viewers. So the privacy problem only confines within the colors of matters. The second solution is that, there are matters that have no color properties. We can use these matters to construct the things which we don't want others to see by projection law.

The final solution is to introduce 2 new particles, Forbidden Wall Particles F_1 , F_2 . The projector will project P to Q that has a null color attribute if P is between the right wall F_1F_2 and the left wall F_2F_1 .

$$F_2F_1 \quad P \quad F_1F_2 \quad A \quad B \quad Q$$

So in this way, we build walls saying that the interior region colors cannot be projected.

2. Problem of interference

Like EM[7] waves that could have interference at one space point from two signals, two projections could have the same projected points Q_1 and Q_2 at the same space point, i.e. $Q_1=Q_2$. To resolve the problem, the physical law will choose the one Q_1 if $\overline{B_1Q_1}$ is less than $\overline{B_2Q_2}$. That is, whenever two projections overlap, choose the one that has minimum distance of \overline{BQ} . If the two distances are

equal, then Q's color attribute is null.

3. Problem of starting and ending projection

Any 2 particles A and B can form a projector. This is dangerous if we have not been ready to use the projector yet. Then it will remain projecting even if we are not ready to use it again. So it would be great if we can have a way to signify that the projector A-B is in use or not.

To solve this problem, here I introduce a new particle, start particle S. If the particle S is in the middle of the projector A-B, this means that the projector is working, otherwise if S is in other positions in space, then the projector stop working. Therefore this can solve the problem of starting and ending projection.

P A-S-B Q

9. CONCLUSION

The unsoundness of Coulomb's law in Electromagnetics comes from the theoretical fact that when an electron hits a proton, it will emit infinite energy. To solve this problem, I propose a new physical law, the projection law, to replace the Electromagnetics(lights) in a possible universe. The projection law, as a physical law, has the instantaneousness property just like Newton's gravitation law. If particles P Q A B are positioned correctly, then Q must have the same color attribute of P at the same time. Next I have made a new eye and new brain with vision cuboid memory for "seeing" the surrounding world. The major difference between the lights and the projection law is that the old brain stores a 2D image for lights while the new brain stores a 3D model of the world for projection law. The edge detection algorithm for computer

vision benefits from the vacuums in 3D space to segment objects from background easily. Then I discuss the realization of projection law in arts and communication. Lastly I present and give solutions to 3 problems of the projection law : the problem of privacy, the problem of interference, and the problem of starting and ending projection.

10. REFERENCES

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<https://en.wikipedia.org/wiki/X-ray>
- [5] MRI
https://en.wikipedia.org/wiki/Magnetic_resonance_imaging
- [6] Cuboid
<https://en.wikipedia.org/wiki/Cuboid>
- [7] EM
Electromagnetic