The Mystery of Cosmic Acceleration

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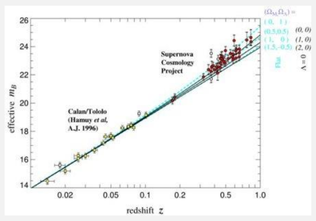
1. Introduction

Cosmic acceleration was observed in 1998. Vacuum energy is one way of explaining this phenomenon. However, not enough written research has been done on it. Same is the case in other approaches to the cosmic acceleration. It is mostly discussed using mathematics.

Through this poster my aim is to explain the mechanism of vacuum energy using words and not mathematical equations, and to come up with another idea to the factor of cosmic acceleration.



Observation of supernovae

$$G_{\mu\nu}+\Lambda g_{\mu\nu}=\frac{8\pi G}{c^4}T_{\mu\nu}$$

Einstein field equation

$$w(t)=\frac{p(t)}{\rho(t)}$$

Cosmological equation of state

2. Methodology

I met with researchers and asked some questions.

Professor Anne Davis
Doctor Philippe Brax
Main interest/Cosmological chameleon

Professor Anne (Right)
Doctor Philippe (Left)
and I (Middle)

Doctor Ota Atsuhisa
Main interest/Cosmology

Doctor Ota (Left)
and I (Right)

3. Q&A at the Interview

How uniformly distributed?

Cosmo is thought of as fluid, scientists consider as a constant repulsive force using the thermodynamics.

$$PV=nRT$$

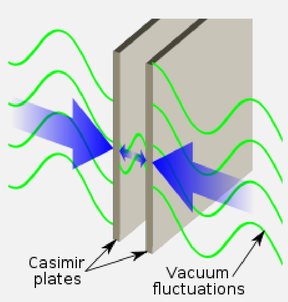
Ideal gas law

Unrevealed mechanism creating gaps?

My Hypothesis “Rubber band model”

As the substance or radiation move through space, it raises the minimum potential of the field.→**Pseudo Casimir effect?**

Casmir effect is only showing the existence of vacuum fluctuation. Moreover, there is a scale problem in vacuum energy. Also scientists do not think that way because the idea is based on classical physics. Even If we accept the concept, it is hard to accept that there is a border in space that divides in and out.



Casimir effect

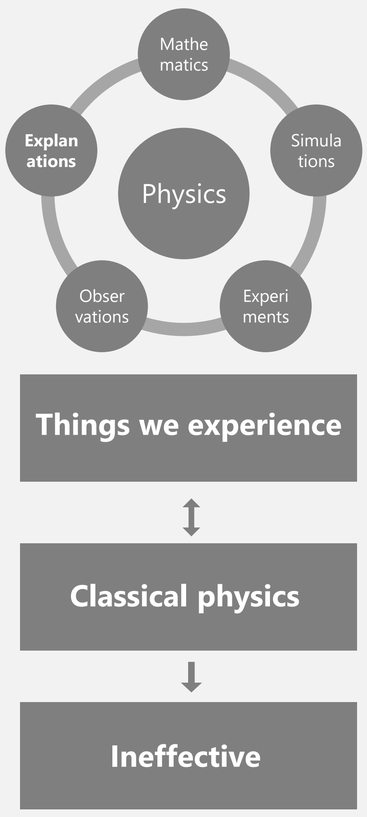
Miraculous apparent acceleration?

It has a problem in terms of accepting the non-uniformity of space. Although, there are approaches in such way
For instance, the Lemaitre-Tolman-Bondi solution.

4. Discussion

The basics of theoretical physics are constructed with a series of theories which is conformed with concreate experimental or mathematical evidences. The idea constructed with experimental intuition is supported by classical physics. Therefore, it is ineffective to discuss about advanced topics which is at the level of modern physics such as cosmic acceleration and vacuum energy. However, I still think it will be necessary to use words to explain what the formula stands for. Mathematics is for certainty, and words are for explaining what is happening.

Now, there are approaches done by questioning the premise.



5. Conclusion

The information written in the books and papers were supported by extensive evidences. Without understanding the fundamental knowledge, it is probably impossible to discuss the advanced topics, because most of the ideas could be denied with this fundamental knowledge. Moreover, new ideas should be able to be researched. This is also the problem which most of the bizarre ideas face. Through my research work I have learned how space had been discovered in academia.

6. Future

For the problem of the calculation of the scale of vacuum energy, breakthrough is required to talk about the real possibilities of vacuum energy as a dark energy.

7. Acknowledgement

I want to thank Professor Anne Davis Doctor Philip, and Doctor Ota who kindly accepted my interview. I also want to thank Doctor David Skinner and Doctor Enrico Pajer who introduced me to such wonderful researchers.

8. Bibliography

Figures/Pictures
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