

## Peer Review

# Review of: "Fermionic Casimir Effect at Finite Temperature in Hořava–Lifshitz Theories"

Amrit Šorli<sup>1</sup>

1. Bijective Physics Institute, Slovenia

The article is written in an elegant and convincing style with excellent mathematical background. The author is an expert in the field, and his orchid profile confirms this.

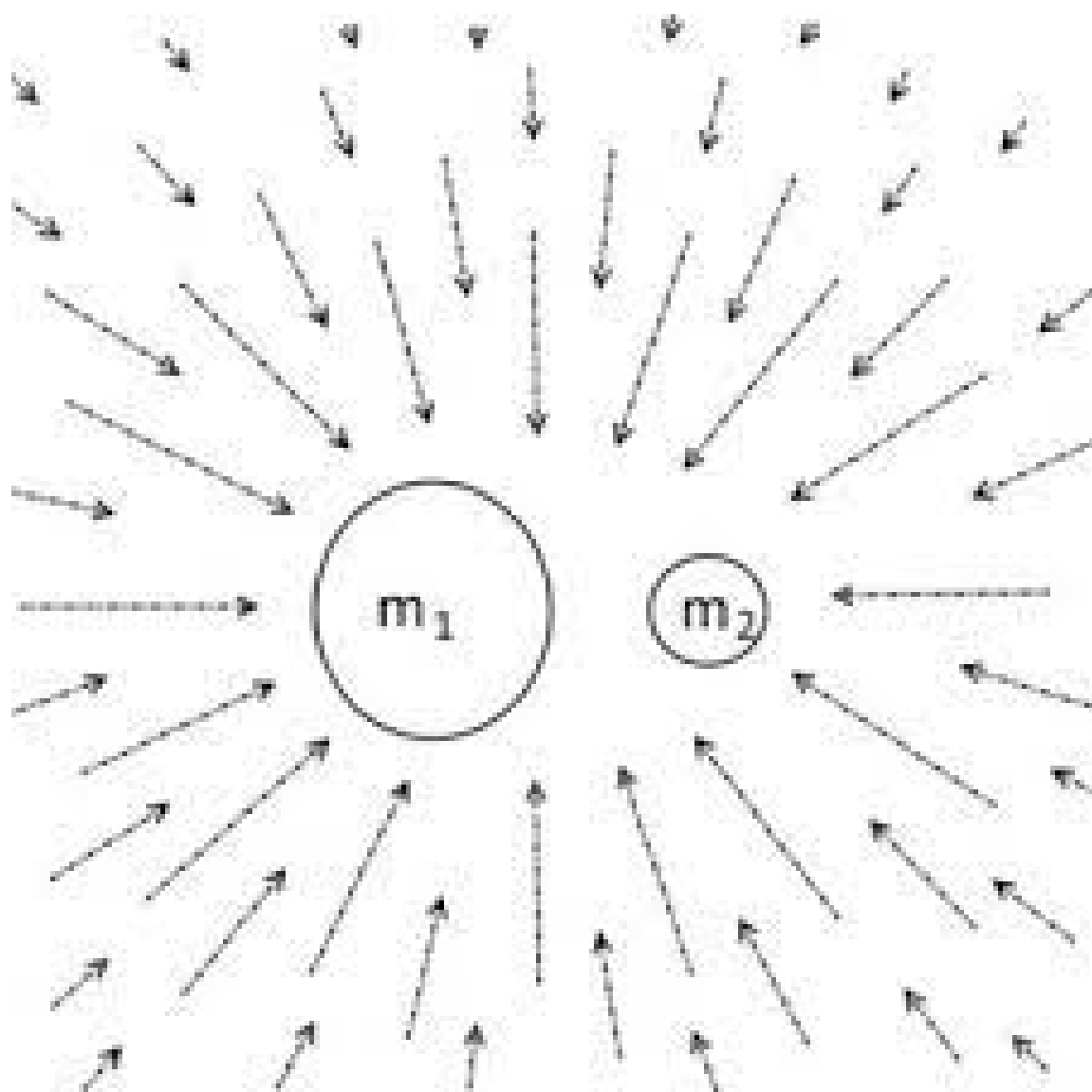
As every article that deals with a given physical model has some crucial elements, this article also has its crucial elements: fermion fields and Casimir pressure.

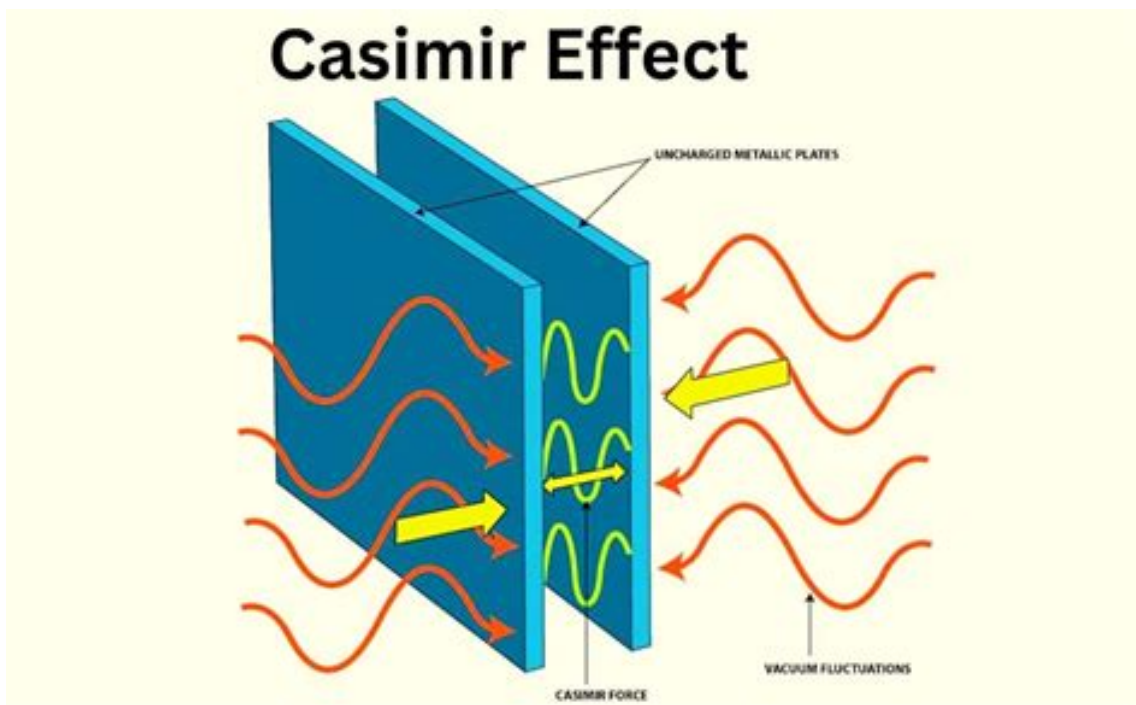
Let's suppose that fermion fields carry Casimir pressure. In this case, the problem arises: how does the atomic structure of Casimir plates interact with the fermion fields? This seems quite a difficult task because we do not have a model that describes such an interaction. At least, I did not come across such a model in the scientific literature.

The second practical technical question is why fermion fields would act in the direction of Casimir pressure?

The other option is that Casimir pressure is the pressure of a physical vacuum. The expert in the field of physical vacuum is Vasiliy Sbitnev <https://link.springer.com/article/10.1007/s10701-015-9980-8>

There is a similarity between the Casimir experiment and the Cavendish experiment, where metal balls are pushed together. I would suggest to the author the possibility that the same force pushes together Casimir plates and Cavendish metal balls. This force is the force of physical vacuum, which also has other names: superfluid space and superfluid quantum space.





Cavendish experiment

Casimir experiment

The idea that gravity is a pushing force of superfluid space has been present in physics for centuries.

<https://archive.org/details/pushinggravityne0000unse>

<https://www.journals.uchicago.edu/doi/abs/10.1086/376003?journalCode=isis>

<https://www.worldscientific.com/doi/epdf/10.1142/S2424942423500056>

At the beginning of the 20<sup>th</sup> century, the idea prevailed in physics that fields and particles exist in an “empty” curved space that carries gravity. Fields and particles have attributes of energy, and they can only exist in a medium that also has physical properties. Here, I see the importance of Sbitnev's work on physical vacuum. It might be that ascribing physical properties to space, Casimir pressure will also appear in a new light.

**Attachments:** available at <https://doi.org/10.32388/0XB42R>

## Declarations

**Potential competing interests:** No potential competing interests to declare.