

Review of the work

“Do Dark Gravity Theories Predict Opera Superluminal Neutrinos and LENR Phenomena?”

According to updated results the initial information /1/ about superluminal motion of neutrinos in OPERA experiment were wrong. In their preparation and interpretation not took into account many important factors (e.g. signal delay in the transition elements of transmission lines; signal distortion associated with reactive parameters; poor synchronization with the GPS data and others). Discussion of this problem does not related to the subject of JCMNS.

The second part of the article is devoted to LENR and has not connected in any way with both the first part and Dark Gravity Theory.

There is no reason to link the diversity of LENR effects (in different environments and under different conditions) with existence of anomalous particles (in particular, the magnetic monopole, which can be produced only in very strong magnetic fields).

If the author would like to propose a specific model, he need to provide specific estimates and calculations.

Only in this case, the work may be useful to readers.

I believe that the work (presented in current form) can not be published in JCMNS.

First i must say that i'm a little bit shocked (*because, though i'm used with referees who don't read more than the submitted article abstract, it's the first time that even the title and the abstract seem to have been over-readen : ca c'est peut etre un peu trop “provocative” , tu peux l'enlever si tu penses que c'est mieux*) . Indeed, almost the first half of the referee review is intended to recall us that the Opera anomaly was not confirmed as if the referee didn't notice the question mark in the title meaning : Do Dark Gravity theories predict that we should see superluminal neutrinos in the Opera experiment , etcetera ... and at the end of the abstract : « Since the Opera result was not confirmed, these discontinuities do not actually allow a propagation of neutrinos oscillating between the two conjugate metrics.» It remains that this possibility had to be explored and must still be explored at various energies, for different kinds of neutrinos and even other particles just because Dark Gravity theories generically open the possibility for apparently superluminal effects provided particles are allowed to jump from one metric to the other. Of course these theories so far are not sufficiently advanced and integrated in the standard model of particle physics to allow us to know for sure whether any of our SM particles are sometimes actually allowed to propagate like this, which particles , at what energies, in which circumstances, etc... but again the possibility has to be explored and will continue to be explored. Let me add that i have of course followed with great attention and in details all the episodes of the Opera Saga since i was myself originally an experimentalist in particle physics, and we repeatedly had seminars at my lab where i could also discuss directly with the Opera experimentalists themselves.

Now i need to open a parenthesis to help the referee understand why i did not remove the discussion of this kind of possible outcomes of DG theories which seemingly has nothing to do with LENR.

I see a priori 3 possible kinds of candidates to explain LENR :

1) Theories according to which we need nothing more than the standard well established physics to understand LENR. These are rather models than theories and try to convince that there exists exceptional conditions in condensed matter allowing LENR to occur. The more i studied these attempts the more i became skeptical about this way of thinking because most of them have appeared as incredibly complicated and unnatural Ad Hoc contortions of the standard frame, ruled out as soon as the hidden unphysical hypothesis these relied on were one after the other pointed out by other physicists and i also must say that i was skeptical from the beginning because after decades of exploration by thousands of talented physicists no one had predicted that such phenomena could occur and at the contrary from the standard physics viewpoint, LENR just remains a list of miracles !

2) Completely new Ad Hoc theories created out of nothing: for me this is even worse because again good theories should not be Ad Hoc and actually not a scientific approach.

3) Theories integrating new physics which have to be coherent extensions of the standard frames and well motivated from the theoretical point of view, which extensions naturally appear to have something to say about LENR. Here we are because the theoretical framework of Dark Gravity Theories is not an Ad Hoc one to address LENR and i believe this is an extremely important and exceptional advantage that deserves attention (exceptional because unfortunately this is not the case for most other candidates in the LENR zoo of theories which belong to categories 1 and 2 above). Neither Dark Gravity theories were constructed to deal with the Opera anomaly when it was first announced, nor the Pioneer anomaly nor any other phenomenological issue actually. The very motivation for such theories was to convince people that it's possible to have a coherent modification of general relativity with a stable anti-gravitational sector. JP Petit was the first to show that the generic phenomenological instability of theories with negative masses could be avoided in a bi-metric context. S Hossenfelder (Phys Rev D) and myself (Int Journ Mod Phys A and GJSFR) have confirmed this even for the most evolved kinds of instabilities that could a priori appear in a modification of GR with an anti-gravitational sector. Hossenfelder is one of the most brilliant young theoreticians in the field of quantum gravity, her blog is famous, and she did publish this article when she was at the perimeter institute discussing actively with proeminent scientists such as Lee Smolin (whom she acknowledges at the end of her article). More recently it's one of the world leader scientists, the father of MOND theories, Milgrom himself, who has again refined his MOND theories, converging to a genuine Dark Gravity Theory, called BiMOND (his best effort so far) with a phenomenological sector very similar to both JP Petit, S. Hossenfelder and my Dark Gravity theories.

So to close this parenthesis i just want to stress that a DG theory has a priori nothing of an Ad Hoc construction intended to finish as another cross in the LENR-theories cemetery. It does not need LENR to exist nor Opera superluminal neutrinos, nor the Pioneer effect, however it might hopefully explain many of such and other anomalies in an unifying framework much more easily and naturally than the standard physics framework because of the unique possibilities opened by its new (extended) gravitational sector.

A peculiar (but very natural as i try to explain in the article) feature of my own DG theory is that field discontinuities are naturally expected in it so i had to explore all associated possible phenomenological outcomes and actually this could have been the title of the article : "phenomenology of DG field discontinuities" because i have gathered in this article all the possible phenomenological signatures associated and expected from discontinuities among which are superluminal effects, Pioneer like effects and LENR like effects : exactly three classes of possible effects and no more, with the good surprise that there seemed to be an existing observed anomaly corresponding to each (before the Opera superluminal neutrinos was discredited).

Now the problem is of course that i could not submit anything related to LENR in anything else but a journal devoted to LENR because of the universal embargo on LENR you must be aware of in all mainstream journals. But then, because LENR referees are a priori not experts in Modified Theories of Gravity i can't develop the whole framework and yet i'm obliged to give the referee sufficient insight into what this theoretical framework really is. This is where the choice of having an article not only about LENR but about several possible signatures associated with field discontinuities appeared the most judicious choice to me because it allowed the basic and most characteristic features of the theory to be presented from a pure and more accessible phenomenological point of view.

Referee: "The second part of the article is devoted to LENR and has not connected in any way with both the first part and Dark Gravity Theory."

Exploring the consequences of field discontinuities (natural outcome of my DG theory) i have to understand what happens to matter and light crossing a discontinuous gravitational potential and the answer is trivial : light sees nothing, matter field behaves exactly as in our basic QM courses where we trained ourselves with squared potentials and barriers. Matter instantaneously jumps to another energy level. With this in mind there are exactly 3 classes of trivial observable phenomenological consequences : time drift between clocks separated by a discontinuity (Pioneer like anomaly), particles appearing to propagate faster than they should if they could jump from one metric to the other thanks to the discontinuity (Opera like anomalies), excess energy or excess heat anomalies due to particles being accelerated by the discontinuous potential (LENR like anomalies).

The referee doesn't see any connection yet i can condense in a few words the main content of the article :

- Shoulders has provided strong evidences for a temperature discontinuity or at least extremely steep potential in what he calls « charged clusters » and this is the perfect signature for a field discontinuity.
- My version of DG naturally comes with field discontinuities (of course if there is a chance for all interactions to be unified, these discontinuities are expected in all kinds of interaction fields).

THIS IS basically the connection!

Referee: "There is no reason to link the diversity of LENR effects (in different environments and under different conditions) with existence of anomalous particles (in particular, the magnetic monopole, which can be produced only in very strong magnetic fields)."

Linking the diversity is exactly what good science should do : unifying.

Moreover this sentence amounts to neglecting dozens of published articles which all have identified new enigmatic objects in very diverse experimental setups and configurations and called them with different names reflecting the independent searchers (most of the time contradictory with respect to each other) understandings. There actually is something new there and it's most probably not a magnetic monopole according to me (though several theorists favour this interpretation), it does not necessarily need huge magnetic fields in the lab rest frame and is also involved in the most common LENR electrolysis experiments.

"If the author would like to propose a specific model, he need to provide specific estimates and calculations. "

I'm a theorist trying to solve theoretical issues. Doing this i got a particular version of DG theory ! Now i'm exploring possible phenomenological consequences of this theory and LENR appears to fit remarkably well. i'm not cooking Ad Hoc (specific) models : it's not my job!

If you want maths you are invited to read our articles in the references, i'm not needing much maths in this article because field discontinuities almost ideally can explain a lot of things already qualitatively and BTW the exact maths would be quite trivial because there is nothing simpler than a square potential as i said before.

Best Regards,

F H-C

Suite à cet échange une tentative avec un troisième referee de JCMNS a à nouveau échoué:

I have examined manuscript once more and concluded that the paper may not be suited for publication in JCMNS.

I make no judgment on the correctness or technical (and theoretical) aspects of the work.

However, from our understanding of the context and motivation, we believe that your paper does not address advances that fall within the main interests of JCMNS readers.

This judgment results in part from our reading of the manuscript and the author answer, which are crucial for our readership.

I suggest that you consider submitting your contribution to a more appropriate journal (e.g. Phys Rev).

Comme si un article traitant de LENR pouvait être accepté dans Phys Rev. Looool