

Review of: "Matter Is the Representation of Space-Time"

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The authors attempt to construct a unification of spacetime and particle physics in which spacetime group elements generate both the spacetime manifold and matter. The main thrust of the paper is that spacetime is not only a background that provides a space for the dynamics of matter, but that matter is the geometric structure of spacetime. This is argued in the paper by the fact that the energy momentum tensor on the right side of the gravitational field equation is equal to the spacetime structure on the left. This implies that the physical properties of matter are equivalent to the geometry of spacetime, and that the quantization of matter particles and fields means the quantization of spacetime.

This paper, although filled with interesting ideas and fragments of ideas, has quite a few issues regarding formatting, presentation, and organization. In particular, there are often long and fragmented sentences that are very hard to understand - particularly in the first half of the paper. For example, the first sentence reads:

'The theory of relativity provides us with a theory of objective spacetime[1], in which the transformation from the coordinates of one observer to the coordinates of another observer, the physical quantities are like the geometry of spacetime, the transformation of coordinates is covariant, and the basic physical equations are like the geometry of spacetime, keeping the formal structure unchanged.'

This sentence is fairly incoherent, and there are a number of other sentences like it. Some paragraphs also have a similar level of incoherence with respect to the sentences that they contain. The entire article reads a bit like a disorganized mind dump that has been parsed through google translate. It is also sometimes difficult to determine which ideas are unique to the authors. These issues make the content (which might otherwise be very good) difficult to understand/appreciate. I highly recommend that the authors go through the paper and break as many long sentences as possible down into shorter, more coherent sentences, and then to restructure the document into sub-sections that encapsulate complete ideas (the current document only has an introduction, body, and conclusion, and could do with some re-structuring).

There are a few small mistakes made in the document, such as the $U(1)$ gauge symmetry of the standard model being associated directly with electromagnetism as opposed to hypercharge, which makes me skeptical of many of the broader statements that come without reference. For example, the claim that the linear space constructed by the field of real numbers is the Minkowski space \mathbb{R}^4 (the dimensions seem off here), or the initial claim that there is a strong entanglement between time and space and that time and space will periodically transform into each other. Is this later claim a generally agreed-upon phenomenon in the literature, or is it only meant within the context of the author's previous

article 'The Matter Wave Is Space-Time Wave'?

Despite these issues, the idea that the continuous distribution of fiber bundles on the base manifold should allow four-dimensional space-time to be described/coordinatized by the wave functions, and that the external and internal spacetimes should be viewed on the same footing is interesting (although these ideas do already appear in, e.g., the NCG approach to particle physics). As the article is currently written, however, it is difficult to understand exactly what the novel and important claims are. For example, is the expression of fermions in terms of arrows, brackets, and products novel, and what does one gain from these expression exactly? There appears to be interesting content here, but I find the article a little impenetrable. This article might be important, but as currently presented, I don't think it will get the readership that it might otherwise deserve, which would be a shame as it does appear that there are nice ideas present.