Why special relativity should not be a template for a fundamental reformulation of quantum mechanics

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Abstract

In a comparison of the principles of special relativity and of quantum mechanics, the former theory is marked by its relative economy and apparent explanatory simplicity. A number of theorists have thus been led to search for a small number of postulates - essentially information theoretic in nature - that would play the role in quantum mechanics that the relativity principle and the light postulate jointly play in Einstein's 1905 special relativity theory. The purpose of the present paper is to resist this idea, at least in so far as it is supposed to reveal the fundamental form of the theory. It is argued that the methodology of Einstein's 1905 theory represents a victory of pragmatism over explanatory depth; and that its adoption only made sense in the context of the chaotic state state of physics at the start of the 20th century - as Einstein well knew.

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