Time Flow Physics: Introduction to a unified theory based on time flow.

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Abstract

This paper summarises a novel approach to constructing a unified theory of fundamental physics, which I have called 'Time Flow Physics' (TFP). It is shown how this provides a natural model which reproduces essential features and principles of Special Relativity, General Relativity, and quantum mechanics in ordinary limits, while diverging in some extreme limits. The key application to cosmology is also given, and the model predicts a theory of evolving fundamental constants, dependant on the expansion of the universe. TFP ultimately contradicts Lorentz symmetry (or covariance), but the divergence from standard physics such as GTR is only empirically evident in extreme limits. TFP is proposed as a realistic empirical theory, but the emphasis here is on its conceptual features. It raises questions about the fundamental nature of covariance, the space-time ontology, simultaneity relations, the reality of metaphysical time flow, and the possibility of a theory of evolving constants. The problem of combining TFP with quantum measurement theory is one of the key difficulties, and this and other issues are briefly discussed at the end of the paper.

Keywords:	Time flow, simultaneity, Lorentz symmetry, covariance, space-time, GTR, STR, quantum mechanics, cosmology, evolving constants, intrinsic curvature, Dirac cosmology, unified theory, symmetry, invariance principles, measurement, operational definitions, theory dependance of measurement,
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