

Proper Time and Mass as Dynamical Variables

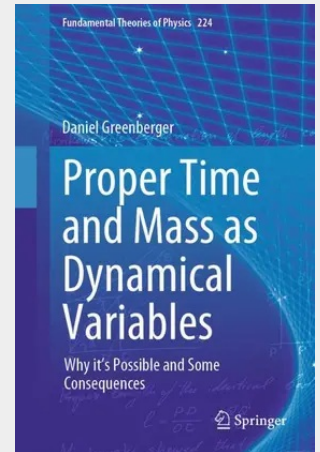
Why it's Possible and Some Consequences

This book highlights that Mass and Proper Time, which are well-defined classically, have all sorts of conceptual problems when considered quantum-mechanically. When systems interact, the masses change to include binding energies, etc., but are not treated as variables within the standard formalism. Similarly, proper time becomes an ambiguous concept when particles are entangled, or when they can take several different paths. But the formalism can easily be extended, so that they become conjugate dynamical variables, and there is an uncertainty principle between mass and proper time. There are many examples of this, but it is not easy to prove convincingly, since one can always experimentally change a mass-time relationship into a momentum-position one, which is well known. It is only in the case of unstable particles, where one sees a clear difference. The new formalism treats a system where particles can decay, even classically, which they cannot do conventionally. In this capacity, the theory merges into other situations where particles decay. But it is clear within this theory, that the mechanism that controls how masses change is gravitational, and so one finally has the possibility of merging gravity with the other forces of nature in a natural way. This can be accomplished by a natural extension of the principle of equivalence.

The book describes how the theory naturally blends gravity into the other forces, providing a hope for an integrated theory of the forces of nature. The emphasis of the book is always physical, rather than mathematical, so that the theory does not seem to be an ad-hoc mathematical add-on to conventional theories.

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