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Standard quantum field theory from entangled relativity

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In this talk, we will explore entangled relativity, a general theory of relativity that offers a more parsimonious approach compared to general relativity when integrated within a quantum field theory framework. Requiring only two universal dimensionful parameters instead of three, entangled relativity retains the key components of general relativity, including a four-dimensional spacetime manifold, a metric tensor representing the mechanical properties of space, inertia, and gravitation, and matter fields generating curvature. The term "entangled" does not directly refer to quantum entanglement but rather emphasizes that matter fields and gravity are intrinsically intertwined and cannot be treated separately at the level of the formulation of the theory. Entangled relativity converges toward, or reduces to, general relativity in most cases but predicts a variable quantum of action (ħ) in response to gravitational phenomena, particularly in dense environments like neutron stars or the early universe. Moreover, one recovers standard quantum field theory in the ħ constant limit. After presenting and explaining the theory, I will present a few predictions that may become observable in the foreseeable future, and which do not depend on any theoretical parameter.

Information on the subject:

https://arxiv.org/abs/2304.09482
https://arxiv.org/abs/2106.03426
https://arxiv.org/abs/2102.10541
https://arxiv.org/abs/2011.14629
https://arxiv.org/abs/1506.03278
https://arxiv.org/abs/1308.2770

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