15th annual conference on Relativistic Quantum Information (North)



Contribution ID: 177

Type: Talk

Conceptual differences between mechanics and field theory, including gravity

Monday, 23 June 2025 16:55 (15 minutes)

While there are many similarities between mechanics and field theory (both classical and quantum), there are also some fundamental conceptual differences. Examples include (i) the existence of derivatives in directions of 3-space (not to be confused with the configuration space directions), (ii) nonlocality of the evolution operator, (iii) different (and inequivalent) notions of "particle", (iv) the Unruh effect, as well as (v) formal results such as the Haag's theorem (QFT) versus the Stone-von Neumann theorem (QM). Given these and other differences, we will discuss whether the toolbox of quantum information theory (historically constructed within the ontology of mechanics) needs to be reexamined to some extent, in order to render it more compatible with the ontology of field theory.

Primary author: VOJINOVIC, Marko (Institute of Physics Belgrade)Presenter: VOJINOVIC, Marko (Institute of Physics Belgrade)Session Classification: Monday Parallel Session C