# Minkowski Conference 2018

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## *Is Special Relativity in Contradiction with Quantum Mechanic?*

# Abstract

*Is special relativity in contradiction with quantum mechanics?*

The average theoretical physicist will spontaneously answer this question with a definite "No!". However, in the very large community of theoreticians who work in the area of the foundations of quantum theory, an overwhelming majority will answer with "Yes!".

In this talk I shall show that in this case the average theoretician is right, and mosts experts in foundational matters wrong, even though they will come up with complicated and sophisticated looking arguments to prove their point.

For this I have developed a mathematical formalism in which one can simultaneously consider classical and quantum systems, a formalism that is completely equivalent to the standard description, but that allows a much better comparison between the two types of systems. It is like looking at the situation from another angle. I have called this formalism an "an algebraic dynamical system". It turns out to be particularly useful for a rigorous study of the foundations of quantum theory. Using it I have found surprising but also very provocative results, which amount to the fact that most of the literature on this subject is wrong, or irrelevant, at best.

For example, the much discussed notion of 'collapse of the wave function' does not exist or is trivial; the well-known thought experiment of 'Schrödinger's Cat' is just a simple classical stochastic process, which has nothing to do with quantum mechanics. There does not exist a 'measurement problem', etc., etc.

I shall not discuss here the general situation the properties of algebraic dynamical systems.

The problem (or so-called problem) of the incompatibility of special relativity and quantum mechanics is a relatively minor one, but it fits nicely in the general theme of these conferences, and is sufficiently representative of the general problem. In this problem *entanglement* is an important notion.

I shall make use of slides. They will be simple; each with just a gew lines of text, and with very few formulas, all this just enough to serve as support for my oral presentation.