The Standard Model as a Philosophical Challenge

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Abstract

There are two opposing traditions in contemporary quantum field theory. Mainstream Lagrangian QFT led to and supports the standard model of particle interactions. Algebraic QFT seeks to provide a rigorous consistent mathematical foundation for field theory, but cannot accommodate the local gauge interactions of the standard model. Interested philosophers face a choice. The can accept algebraic QFT on the grounds of mathematical consistency and general accord with the semantic conception of theory interpretation. This suggests a rejection of particle ontology. Or they can accept the standard model on the grounds of its established success. This alternative, which I defend, suggests revising philosophical accounts of scientific theories.

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