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The Formulation of Quantum Field Theory in Curved Spacetime

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The usual formulations of quantum field theory in Minkowski spacetime make crucial use of Poincare symmetry, positivity of total energy, and the existence of a unique, Poincare invariant vacuum state. These and other key features of quantum field theory do not generalize straightforwardly to curved spacetime. We discuss the conceptual obstacles to formulating quantum field theory in curved spacetime and how they can be overcome.