

In this talk, we propose a new approach to quantum fields in terms of category algebras and states on categories. We define quantum fields and their states as category algebras and states on causal categories with partial involution structures. By utilizing category algebras and states on categories instead of simply considering categories, we can directly integrate relativity as a category theoretic structure and quantumness as a noncommutative probabilistic structure. Conceptual relationships with conventional approaches to quantum fields, including Algebraic Quantum Field Theory (AQFT) and Topological Quantum Field Theory (TQFT), are also be discussed.