

# Simultaneous Measurement of Non-commuting Observables and Cliffordian generalizations of Quantum Theory

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## **Abstract**

The simultaneous measurement of several noncommuting observables is possible and is modeled by using semigroups of completely positive maps on an algebra with a non-trivial center. The resulting piecewise-deterministic dynamics leads to chaos and to nonlinear iterated function systems (quantum fractals) on complex projective spaces. Our approach leads to possible generalization of quantum theory to convex state structures build out of families of idempotents of a Clifford algebra. As an example we will discuss bubble chamber track formation and quantum measurement processes where pure states live on  $n$ -spheres rather than in complex projective spaces. The talk will be accompanied by computer simulations.