## Representations of Quantum Operations in Geometric Algebra

Timothy F. Havel Massachusetts Institute of Technology, USA

A "quantum operation" is a physically realizable transformation of a quantum state. The outcome is generally a family of mutually indistinguishable probability distributions over the underlying Hilbert space, which is usually described by a density operator. Some new ways of looking at these fundamental concepts of quantum physics using geometric (aka Clifford) algebra will be introduced, along with some applications to quantum information processing.