1096-81-2258 **Alexander Wilce*** (wilce@susqu.edu), Department of Mathematics, Susquehanna University, Selinsgrove, PA 17837. *Probabilistic foundations for quantum theory.*

It's well-known that quantum mechanics can be seen as a generalization of classical probability theory, in which random variables are replaced by self-adjoint elements of a C* algebra and probability measures, by states thereon. Unfortunately, this structure has proved difficult to motivate in purely probabilistic or operational terms. There has been no shortage of attempts to do so: inconclusive efforts in this direction include work of von Neumann in the late 1920s, as well as large part of the literature on quantum logic.

Recently, however, ideas from quantum information theory have led to remarkable progress on this question, as it pertains to *finite dimensional* systems. After quickly surveying some of this work, and its antecedents, I'll sketch a new approach having some advantages of simplicity, elegance and generality. (Parts of this talk represent joint work with Howard Barnum and Mathew Graydon.) (Received September 17, 2013)