

# **Physics Colloquium**

**“Quantum Mechanics without Wavefunctions”**

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In David Bohm's causal/trajectory interpretation of quantum mechanics, a physical system is regarded as consisting of BOTH a particle AND a wavefunction, where the latter “pilots” the trajectory evolution of the former. In this presentation, we show that it is possible to discard the wavefunction concept altogether, thus developing a complete mathematical formulation of time-dependent quantum mechanics directly in terms of real-valued trajectories alone. Moreover, by introducing a kinematic definition of the quantum potential, a generalized action extremization principle can be derived. The latter places very severe a priori restrictions on the set of allowable theoretical structures for a dynamical theory, which is shown to include both classical mechanics and quantum mechanics, and a few other possibilities. Theoretical, interpretational, and computational ramifications are discussed.

**Thursday, Jan 26, 3:40pm in Sci 234**

**Refreshments at 3:00 in Science 103**