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Classical Trajectories from Coherent Quantum Oscillations ALAN M. KADIN, Princeton Junction, NJ 08550 USA — In the conventional Copenhagen interpretation of quantum mechanics, classical behavior arises from microscopic coherent quantum systems only in the presence of decoherence on the macroscopic scale. On the contrary, we derive classical Hamiltonian trajectories for a confined quantum wave directly from coherent phase evolution on the microscopic scale, without decoherence or wavefunction collapse (see also [1]). This suggests that the basis for classical macroscopic physics, including relativity, lies in the microscopic behavior of coherently oscillating quantum fields. An outline of such a theory will be presented, which resolves longstanding paradoxes involving wave-particle duality, quantum entanglement, and the quantum-to-classical transition.

[1] A.M. Kadin, "Waves, Particles, and Quantized Transitions: A New Realistic Model of the Microworld," http://arxiv.org/abs/1107.5794 (2011).

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