Definition of the Measurement Problem

Having completed the development of a test within the formalism of quantum mechanics that allows Schrödinger unitary evolution to be distinguished from evolution that occurs during measurement and considered the incompleteness of the current formalism and the requirements to improve upon the current formalism, the point has been reached whereby the measurement problem can be well defined.

Definition of the Quantum Measurement Problem:

> *The measurement and unitary postulates of quantum mechanics, when applied to particles that include a bona fide measurement device, are inconsistent in that two contrary predictions arise. The joint system and device including the local (time-like) environment evolve via Schrödinger's equation to an entangled state that is in principle experimentally distinguishable within the current formalism from the case of measurement for which there is evolution to a single system-device-local environment state that is a product state. Such distinguishability is independent of the Hamiltonian, parameters of the device, and on interaction with the local environment surrounding the device.*

The fact that the two evolution modes are, within the same formalism, in principle experimentally distinguishable, is why the measurement problem is a real problem that can be both theoretically and experimentally investigated using scientific methodology. This situation can be summarized by the dictum:

> *To the extent there is entanglement, there is no measurement.*