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Quantum Histories and Measurements in Spacetime EDWIN SEIDEWITZ, Self — Traditional interpretations of quantum theory in terms of wave function collapse are particularly unappealing when considering the universe as a whole, where there is no clean separation between classical observer and quantum system and where the description is inherently relativistic. The consistent histories approach provides an attractive "no collapse" interpretation of quantum physics, but it's applicability to relativistic quantum mechanics and quantum field theory has not been clear. However, in a relativistic spacetime formulation, the quantum history of the entire universe can be considered to be essentially an eigenstate of the measurements made within it. Generalizing Zurek's concepts of einselection and envariance, one can justify the Born probability for selecting a specific such eigenstate, which then further implies that the statistical distribution of repeated experimental measurements within the universe must also tend towards the Born rule. This presentation shows how such a relativistic quantum histories interpretation follows from the basic assumptions of a Hilbert space representation of quantum systems in the universe, removing the dependency on a specific spacetime path formalism that was used in previous work on this topic.

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