

Theory: Fundamental decoherence from quantum spacetime

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Quantum properties of spacetime can affect the evolution of quantum systems. We discuss this in a non-commutative spacetime setting, showing that the standard Liouville-von Neumann equation is replaced by a Lindblad equation. This leads to a decoherence mechanism by which pure states can evolve into mixed states. The decoherence time for the evolution of a free particle is used to show that the Planck mass is the maximum allowed mass for elementary quantum systems.

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