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Transition from Quantum to Classical Information in a Superfluid and Holographic Reconstruction of the Entangled States.

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*ABSTRACT*

We show that in general the transition from the classical to quantum behavior depends on the probing length scale, and occurs for microscopic length scales, except when the interactions between the particles are very weak. This transition explains why, on macroscopic length scales, physics is described by classical equations.

In particular, the smooth transition from localized quantum mechanical information to classical waves may allow one to holographically reconstruct entangled quantum states

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