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Decoherence, broadcasting and the emergence of phase-space

The only data available in the search for a quantum theory of gravity is its classical limit. Unfortunately we do not understand how to define, nor derive, the classical limit of a general quantum theory. I present technical results which make precise the idea that classical physics emerges as information redundantly stored in an environment—as proposed in the latest refinement of the theory of decoherence. Such information is always characterized by a single generalized observable (aka POVM) which relates the quantum system to an effective classical system. This shines new light on the role played by coherent states and symmetries in relating known classical theories to their quantum foundations. An important point for gravity is that this framework does not assume a preexisting notion of time.