

# Classical-Quantum Approximation for Bipartite Quantum Systems

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We derive a “classical-quantum” approximation scheme for a broad class of bipartite quantum systems. In this approximation, one subsystem’s evolution is governed by classical equations of motion with quantum corrections, and the other subsystem evolves quantum mechanically with equations of motion informed by the classical degrees of freedom. Similar approximations are common when discussing the backreaction of quantum fields on curved spacetime, as in Hawking radiation around black holes or the generation of primordial perturbations in inflation.

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