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Quantum kinetic description of attractive two-component fermions from the weak-coupling Fermi liquid to the strong-coupling Bose liquid regime MEHRTASH BABADI, Department of Physics, California Institute of Technology, Pasadena, CA 91125, USA, EUGENE DEMLER, Department of Physics, Harvard University, Cambridge, Massachusetts 02138, USA — We derive a set of quantum kinetic equations governing the non-equilibrium dynamics of two-component fermions with short-range attractive interactions from the leading order large-N expansion of the effective action of an Sp(N)-symmetric Fermi gas. The derived kinetic equations reduce to the Boltzmann equation describing the evolution of the occupation of fermionic quasiparticles and long-lived composite bosons in the weak- and strong-coupling limits, respectively, while providing a smooth interpolation of the two limits for the intermediate pairing pseudogap regime. The obtained formalism successfully explains the findings of a recent experiment with two-dimensional ultracold Fermi gases.

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