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Flow equation approach to one-body and many-body localization VICTOR QUITO, University of Campinas; California Institute of Technology, PARAJ BHATTACHARJEE, DAVID PEKKER, GIL REFAEL, California Institute of Technology — We study one-body and many-body localization using the flow equation technique applied to spin-1/2 Hamiltonians. This technique, first introduced by Wegner, allows us to exact diagonalize interacting systems by solving a set of first-order differential equations for coupling constants. Besides, by the flow of individual operators we also compute physical properties, such as correlation and localization lengths, by looking at the flow of probability distributions of couplings in the Hilbert space. As a first example, we analyze the one-body localization problem written in terms of spins, the disordered XY model with a random transverse field. We compare the results obtained in the flow equation approach with the diagonalization in the fermionic language. For the many-body problem, we investigate the physical properties of the disordered XXZ Hamiltonian with a random transverse field in the z-direction.

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