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Many-body localization of fermions with attractive interactions FABIAN HEIDRICH-MEISNER, LMU Munich, SHENG-HSUAN LIN, Technical University Munich, FLORIAN DORFNER, LMU Munich — We consider spinless fermions in one dimension with attractive interactions in the presence of uncorrelated diagonal disorder. This system is known to have a delocalized Luttinger-liquid phase in its ground state for weak disorder [1]. We provide numerical evidence that this zero-temperature delocalized phase smoothly evolves into an ergodic phase at finite temperatures. Moreover, the finite-energy density transition between the ergodic and the MBL phase terminates at the zero-temperature transition between the delocalized and localized ground-state phases. Our work is based on analyzing the finite-size scaling of the von-Neumann entropy, the level spacing distribution and properties of the one-particle density matrix [2]. As a result we obtain the energy-density versus interaction-strength phase diagram at weak disorder. [1] Schmitteckert et al. Phys. Rev. Lett. 80, 560 (1998) [2] Bera et al. Phys. Rev. Lett. 115, 046603 (2015)

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