

Abstract Submitted
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Revealing the breakdown of spin-charge separation in spin-imbanced fermions in one dimension using quench dynamics¹ PAATA KAKASHVILI, Department of Physics and Astronomy, Rutgers University, MICHAEL SEKANIA, Center for Electronic Correlations and Magnetism, Institute of Physics, University of Augsburg — Recently, spin-imbanced fermions in one dimension have attracted considerable attention both theoretically and experimentally. This system was successfully simulated using ultracold atoms in optical lattices. The phase diagram was measured and found to be in agreement with exact analytical calculations. It was also established theoretically that the spin-charge separation, an important property of Luttinger liquids, is absent. Low-energy bosonic excitations do not carry spin and charge separately due to the interaction between spin and charge degrees of freedom. Based on our numerical (time-dependent density matrix renormalization group method (t-DMRG)) and analytical calculations (Bethe Ansatz, Bosonization) on the Hubbard model, we propose quench experiments which not only reveal the breakdown of spin-charge separation but also make it possible to study the so called “string” bound states in this system.

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