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Quantum quenches and work distributions in ultra-low-density systems YULIA SHCHADILOVA[1], Russian Quantum Center, PEDRO RIBEIRO, MASUDUL HAQUE, Max Planck Institute for the Physics of Complex Systems —

In our contribution we present results on quantum quenches in systems with a fixed number of particles in a large volume, the situation accessible in cold atom experiments. We show that the typical differences between local and global quenches present in systems with regular thermodynamic limit are lacking in this low-density limit. In particular, we show that local and global quenches can have power-law work distributions (edge singularities) typically associated with only local quenches for finite-density systems. We show that this regime allows for large edge singularity exponents beyond that allowed by the constraints of the usual thermodynamic limit (e.g., by Anderson's orthogonality catastrophe). This large-exponent singularity has observable consequences in the time evolution, leading to a distinct intermediate power-law regime in time. We demonstrate these results using local quantum quenches in a low-density Kondo-like system, and additionally through global and local quenches in Bose-Hubbard, Aubry-Andre, and hard-core boson systems in the low-density regime.

[1] Y.E. Shchadilova, P. Ribeiro, M. Haque, Quantum quenches and work distributions in ultra low density systems, arXiv:1303.4103, (2013).

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