Superfluid density and quasi-long-range order in the one-dimensional disordered Bose-Hubbard model

Thu, 2016-03-03 12:25 - Werner Weiss [1] **Date:** 2016-01-18
Author(s):
M. Gerster, M. Rizzi, F. Tschirsich, P. Silvi, R. Fazio, S. Montangero

Reference:
New J. Phys. 18, 015015 (2016)
http://dx.doi.org/10.1088/1367-2630/18/1/015015 [2]

URL:
http://iopscience.iop.org/article/10.1088/1367-2630/18/1/015015 [3]

We study the equilibrium properties of the one-dimensional disordered Bose–Hubbard model by means of a gauge-adaptive tree tensor network variational method suitable for systems with periodic boundary conditions. We compute the superfluid stiffness and superfluid correlations close to the superfluid to glass transition line, obtaining accurate locations of the critical points. By studying the statistics of the exponent of the power-law decay of the correlation, we determine the boundary between the superfluid region and the Bose glass phase in the regime of strong disorder and in the weakly interacting region, not explored numerically before. In the former case our simulations are in agreement with previous Monte Carlo calculations.

- 12.10.+i Simulations of many-body interactions [4]
- H2020 [5]
- QIPC [6]
- RySQ [7]
- Result [8]
- SIQS [9]
- 04.40.+c Entanglement, chaos and disorder [10]
- 04.50.+m Efficient simulation of quantum many-body systems [11]
- 05.80.+m Quantum information & complex systems [12]
- 02.90.+f Foundational issues of quantum mechanics [13]
- 15.20.Ol Optical lattices [14]

Source URL:
http://qurope.eu/db/publications/superfluid-density-and-quasi-long-range-order-one-dimensional-disordered-bose-hubb-0

Links:
[1] http://qurope.eu/users/wweiss
[2] http://dx.doi.org/10.1088/1367-2630/18/1/015015
[3] http://iopscience.iop.org/article/10.1088/1367-2630/18/1/015015
[4] http://qurope.eu/category/qics/10-quantum-computation/12-simulations/1210i-simulations-many-body-interactions
[5] http://qurope.eu/category/european-commission/h2020
[6] http://qurope.eu/category/qipc/qipc
[7] http://qurope.eu/category/projects/rysq
[8] http://qurope.eu/category/attribute/result
[9] http://qurope.eu/category/projects/ips/siqs
[10] http://qurope.eu/category/qics/00-quantum-information-science/04-entanglement-many-body-sy

stems/0440c-entanglement-ch
[11] http://qurope.eu/category/qics/00-quantum-information-science/04-entanglement-many-body-systems/0450m-efficient-simul
[12] http://qurope.eu/category/qics/00-quantum-information-science/05-cross-disciplinary-links/0580m-quantum-information-c
[13] http://qurope.eu/category/qics/00-quantum-information-science/02-fundamental-problems/0290f-foundational-issues-quant
[14] http://qurope.eu/category/qics/10-quantum-computation/15-implementations-quantum-optics/1520ol-optical-lattices