Fidaleo, Francesco; **Guido, Daniele**; **Isola, Tommaso**
Bose-Einstein condensation on inhomogeneous amenable graphs. (English) Zbl 1223.82012
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The authors investigate the Bose-Einstein condensation on nonhomogeneous amenable networks for the model describing arrays of Josephson junctions. Here the network is described by an infinite topological graph X, where it is considered free bosons described by the Canonical Commutation Relations on $l^2(VX)$ and pure hopping Hamiltonian is the free Hamiltonian described on the one particle space $l^2(VX)$, by $H = ||A||I - A$, where A is the adjacency operator acting on $l^2(VX)$. It is proved that for the nonhomogeneous networks like the comb graphs, particles condensate in momentum and configuration as well. In this case different properties of the network, of geometric and probabilistic nature, such as the volume growth, the shape of the ground state, and the transience, all play a role in the condensation phenomena.

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MSC:

82B20 Lattice systems (Ising, dimer, Potts, etc.) and systems on graphs arising in equilibrium statistical mechanics
82B10 Quantum equilibrium statistical mechanics (general)
46L60 Applications of selfadjoint operator algebras to physics

Keywords:

Bose-Einstein condensation; Perron-Frobenius theory; amenable inhomogeneous graphs

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