BOSE EINSTEIN CONDENSATION ON NONHOMOGENEOUS NETWORKS

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Abstract. We investigate the Bose–Einstein Condensation on nonhomogeneous amenable networks for the model describing arrays of Josephson junctions. The resulting topological model, whose Hamiltonian is the pure hopping one given by the opposite of the adjacency operator, has also a mathematical interest in itself. We show that for the nonhomogeneous networks like the comb graphs, particles condensate in momentum and configuration space 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 rôle in the condensation phenomena. The situation is quite different for homogeneous networks where just one of these parameters, e.g. the volume growth, is enough to determine the appearance of the condensation. The mathematical aspects of the Bose–Einstein Condensation on some nonamenable networks like the Cayley Trees are also briefly discussed.

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