# Atomtronics: Landauer-Büttiker equation for bosonic carriers

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Recently much attention is paid to the problem of conductivity with cold atoms – the emerging field which is often referred to as atomtronics. Clearly, when speaking about atomtronics, one should distinguish between the cases of Bose and Fermi atoms. In the latter case, as it was demonstrated in the recent experiment [1], atomic current obeys the celebrated Landauer-Büttiker equation. Using a simple (Bose-Hubbard based) microscopic model of conductivity [2, 3, 4] we derive an analogue of this equation for Bose atoms [5].

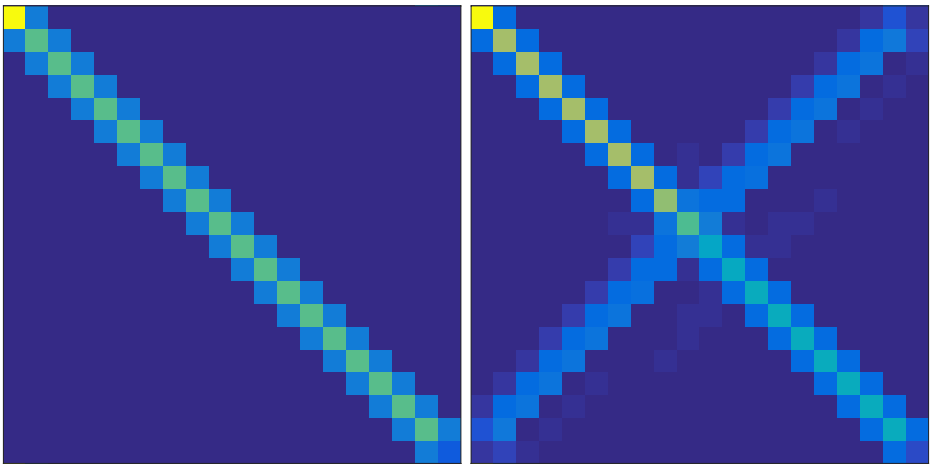

FIG. 1: Stationary single-particle density matrix of the bosonic carriers in the one-dimensional lead connecting two reservoirs with different chemical potential. The left and right panels refer to the ideal lead and the lead with a point-like scatterer, respectively.

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