Abstract Submitted
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Counterintuitive behavior of simulated network's conductance analogous to the Braess paradox[1] SÉBASTIEN TOUSSAINT, IMCN/NAPS, Université catholique de Louvain, Belgium, DEMETRIO LOGOTETA, MARCO PALA, IMEP-LAHC, Universit Grenoble Alpes, France, VINCENT BAYOT, BENOIT HACKENS, IMCN/NAPS, Université catholique de Louvain, Belgium — Suppressing a channel from a two-terminal mesoscopic network defined in a two-dimensional electron system (2DES) can paradoxically increase its conductance. This counterintuitive behavior analogous to the Braess paradox is evidenced in [1] by simulating the networks conductance (G) when progressively depleting one of its channels with a biased local probe. By means of 3D self-consistent Poisson-Schrödinger simulations based on the NEGF formalism we investigate the occurrence circumstances of this transport anomaly under the influence of a scanning tip. By simulating the current density and local density of states within the network in the coherent and ballistic transport regime, we can follow the modification of the electron flow when the anomaly occurs. This allows to get insights about the role of a simulated disordered potential within the 2DES and permit to evaluate the tip influence on the 2DES potential landscape. Interference phenomena between different network paths can be modified by simulating G under a magnetic field orthogonal to the 2DES. Different geometries and network congestion are also discussed. [1] M. G. Pala *et al.*, Phys. Rev. Lett. 108, 076802 (2012).

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