Abstract Submitted
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Puzzling electron behavior analogous to the Braess paradox in a mesoscopic network[1] SÉBASTIEN TOUSSAINT, SÉBASTIEN FANIEL, FREDERICO MARTINS, IMCN/NAPS, Université catholique de Louvain, Belgium, MARCO PALA, IMEP-LAHC, Université Grenoble Alpes and CNRS, France, LUDOVIC DESPLANQUE, XAVIER WALLART, IEMN, UMR CNRS and UST, France, SERGE HUANT, HERMANN SELLIER, Institut Néel, Université Grenoble Alpes and CNRS, France, VINCENT BAYOT, BENOIT HACKENS, IMCN/NAPS, Université catholique de Louvain, Belgium — A counterintuitive behavior analogous to the Braess paradox is encountered in a two-terminal mesoscopic network patterned in a two-dimensional electron system (2DES) [1]. Decreasing locally the electron density of one channel in the network paradoxically leads to an increased network conductance. Our scanning gate microscopy experiments reveals this puzzling conductance variation, thanks to tip-induced localized modifications of electron flow throughout the network's channels at low temperature, in the ballistic and coherent regime of transport. We compare the amplitude of the measured anomalous conductance variation with conductance changes induced by other mechanisms at play in the mesoscopic network, such as interference phenomena between different paths, and Coulomb blockade due to disorder-induced localized states. The robustness of this puzzling behavior is inspected by varying the global 2DES density, magnetic field and temperature. [1] M. G. Pala *et al.*, Phys. Rev. Lett. 108, 076802 (2012).

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