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Perfect dc conductance of a finite width Mott insulator sandwiched between metallic leads at zero temperature: a quantum emergent phenomenon in strongly correlated multilayers[1] HAND ZENIA, JIM FREERICKS, Department of Physics, Georgetown University, Washington, DC 20057 USA, HULIKAL KRISHNAMURTHY, Centre for Condensed Matter Theory, Department of Physics, Indian Institute of Science, Bangalore 560012, India, THOMAS PRUSCHKE, Institute for Theoretical Physics, University of Göttingen, Friedrich-Hund-Platz 1, D-37077 Goettingen, Germany — Self-consistent inhomogeneous DMFT calculations as well as analytical investigations of the electronic structure of a multilayered device are presented. The device consists of two semi-infinite leads of a ballistic metal that sandwich an interacting barrier. The interactions in the barrier are described by the Hubbard model with the whole system particle-hole symmetric. We find that for a finite barrier no matter how strong the interaction, the system becomes a Fermi liquid with a perfect metallic conductivity at low enough temperature. We argue that at zero temperature and frequency the Luttinger theorem holds and that the system has a well defined Fermi surface. The perfect conducting state may be extremely fragile to finite temperature, finite driving electric fields, finite driving frequencies, or disorder, so it will often be difficult to see experimentally. We will discuss possible experimental realizations of the phenomena

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