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Measurement of Tunneling Conductance of Two-Dimensional Electrons in a Si MOSFET Nanostructure HONG PAN, MATTHEW HOUSE, MING XIAO, HONGWEN JIANG — The properties of strongly correlated two-dimensional electrons in semiconductor heterostructure continue to be of a fundamental interest of condensed matter physics [1]. A collection of transport studies have revealed a wealthy of interesting effects in the low-electron density limit, particularly in Si MOSFET structures [2]. In this talk, we present an alternative, tunneling conductance measurement of the 2D electrons in a Si MOSFET nanostructure. In our device, a global gate is used to control the 2D electron density. In addition, a set of small gates, as small as 50nm, forms a lateral tunneling barrier for the measurements. We find that there is a strong correlation between the still puzzling metal-insulator transition observed in transport [2] and our tunneling characteristics. The tunneling conductance is studied under different carrier density and in-plane Magnetic field. The project is supported by the NSF under Grant No. DMR-0804794.

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