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Interplay of Interactions and Phase Coherence in Open Quantum Dots ILEANA RAU, MICHAEL GROBIS, RON POTOK, Stanford University, HADAS SHTRIKMAN, Weizmann Institute, DAVID GOLDHABER-GORDON, Stanford University — The effect of Coulomb interactions on the electronic properties of a confined quantum system greatly weakens when electrons are allowed to rapidly enter and exit the system. For electron transport through a quantum dot, increasing the coupling of the dot to nearby leads causes a transition from the Coulomb blockade regime to a regime dominated by interference phenomena. We have investigated this transition in large, micron-sized quantum dots and have found that Coulomb blockade effects persist in a regime where they had generally been assumed absent: when a dot is coupled by one fully transmitting mode to each of two leads. We discuss the interplay of these residual Coulomb interactions with phase coherent transport through a dot. We also examine how the subtle suppression of conductance by these Coulomb interactions affects the electron dephasing rate at low temperatures in open quantum dots.

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