

MAR14-2013-020492

Abstract for an Invited Paper
for the MAR14 Meeting of
the American Physical Society

Many-Body Switches

ALLAN H. MACDONALD, University of Texas at Austin

Most current electronic devices use gate voltages to switch individual electron transport channels on or off. This architecture necessarily leads to operating voltages that are much larger than the temperature thermal energy, and places lower bounds on power consumption that are becoming. I will discuss strategies for achieving devices in which gates are used to collective many-electron states, in principle allowing charge transport to be switched by smaller voltage changes and both operating voltages and power consumption to be reduced. I will specifically address devices based on the properties of itinerant electroninsulating magnetic systems, and devices based on bilayer exciton condensation. This work is based on work performed in collaboration with Sanjay Banerjee and Frank Register.