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Microscopic theory for the charge stability diagram of coupled quantum dot systems[1] SHUO YANG, XIN WANG, SANKAR DAS SARMA, Condensed Matter Theory Center, Department of Physics, University of Maryland, College Park, MD 20742 — We present a quantitative microscopic theory for the charge stability diagram of coupled quantum dot systems. Using the configuration interaction method we obtain a generalized Hubbard model, from which the charge stability diagram is calculated and compared with experiments. We establish an exact connection between experimental measurements and the microscopic theory, and predict some experimentally observable quantum effects. We also map the classical capacitance model to the extended Hubbard model, and argue that the effect of spin-exchange and various hopping terms cannot be expressed in the capacitance model.

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