



# TRR 80 Sonderseminar

Am Donnerstag, den 8. Dezember um 14:30 Uhr

spricht

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über das Thema

## *Theoretical Description of the Capacitance of Strongly Correlated Multilayers*

Recent experiments on electronic gasses formed at the interfaces of multilayered oxide devices have shown a large enhancement of the device capacitance due to strong-correlation effects. We use inhomogeneous dynamical mean-field theory to calculate the capacitance of model strongly correlated multilayered nanostructures. Our device is composed of semi-infinite metallic leads coupled via a strongly correlated dielectric barrier region. The barrier region is a Mott insulator dielectric with adjustable interaction strength. The many-body effects enter via electronic charge reconstruction which occurs near the interfaces and changes with the applied voltage. We examine the effects of varying the barrier thickness, temperature, potential difference, screening length, and chemical potential. The on-site interaction strength displays a relatively strong effect on the capacitance, while the potential and temperature show a weaker dependence. We discuss some of the subtlety involved in finding the device capacitance when charge is spread out over multiple layers. In particular, it is difficult to properly define the geometric capacitance in the absence of strong correlation effects. We end by discussing future directions, including examining regions of parameter space where the electronic charge reconstruction can be modified by phase separation, and where the capacitance is likely to have large nonlinear effects with the voltage.

Gäste sind herzlich willkommen.

Der Vortrag findet im Seminarraum S-439/ Institut für Physik, Universität Augsburg statt.

Gastgeber: Prof. Dr. Thilo Kopp  
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