

Abstract Submitted
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Electrostatic Interface Tuning in Correlated Superconducting Heterostructures¹ NATALIA PAVLENKO, THILO KOPP, Institute of Physics, Center for Electronic Correlations and Magnetism, University of Augsburg, EP VI TEAM — In high-temperature superconducting oxide films, transverse electric fields have been used to switch between superconducting and insulating states by electrostatically tuning the free carrier density. We analyze d-wave pairing within a microscopic model for heterogeneous multilayer systems and show that a coupling to electric dipoles and phonons at the interface of cuprate film and dielectric gate localizes the injected charge and leads to a superconductor-insulator transition [1]. We find that in the correlated oxide films, the strong interface polaron effect is inherently related to the stabilization of interface charge ordering and inhomogeneous states. The formation of such states results in a dramatic modification of the doping dependent phase diagram close to and above the optimal doping which is expected to shed light on recent electric field-effect experiments with HTSC cuprates.

[1] N. Pavlenko and T. Kopp, Phys.Rev. B, in print (2005).

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