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Control of correlated electrons in metal-oxide superlattices

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We will outline recent results of an experimental program aimed at controlling the phase behavior of correlated electrons through the synthesis and characterization of metal-oxide superlattices, with particular emphasis on copper and nickel oxides. Control parameters include the occupation of transition-metal d-orbitals [1] and the dimensionality of the electron system [2]. In particular, we will demonstrate control of the electron-phonon interaction in cuprate superlattices [3], and of the spin density wave polarization in nickelate superlattices [4]. These results also highlight the power of resonant x-ray scattering [1,4], spectral ellipsometry [2], and Raman scattering [3] as microscopic probes of the electron system in metal-oxide heterostructures and superlattices.

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