Observation of strong correlations in low-dimensional oxides by nonlinear optics

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Abstract:

The technology for the growth of ultrathin oxide films or heterostructures is approaching the same level of atomic control as in the case of semiconductors.
Yet, in contrast to semiconductors strong correlations between charge and spin carriers at the interface dominate and may lead to novel and sometimes exotic interface states.
In my talk I will discuss $SrTiO_3/LaAlO_3$ interfaces and thin EuO films as prototypical examples. Both systems are investigated by optical second harmonic generation.
In the $SrTiO_3/LaAlO_3$ system the electronic reconstruction at the interface is observed. In EuO characteristic phase transitions and the influence of an electric field and/or strain are investigated.