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Anomalous transport properties of SrTiO3 accumulation layers.

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We study the low temperature conductivity of the electron accumulation layer induced by the very strong electric field at the surface of SrTiO3 sample. Due to the strongly nonlinear lattice dielectric response, the three-dimensional density of electrons in such a layer decays with the distance from the surface very slowly. We show that when the mobility is limited by the surface scattering the contribution of such a tail to the conductivity diverges at large distances because of growing time electrons need to reach the surface. We explore truncation of this divergence by the finite sample width, by the bulk scattering rate, by the back gate voltage, or by the crossover to the bulk linear dielectric response. As a result we arrive at the anomalously large mobility, which depends not only on the rate of the surface scattering, but also on the physics of truncation. Similar anomalous behavior is found for the Hall factor, the magneto-resistance, and the thermo-power.