

Mobility of the surface electron in quasi-zero-dimensional system

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We present results of experimental study of surface electron transport over liquid helium covering a quasi-zero-dimensional substrate. The substrate consists of a silicon plate of the thickness 0.2 mm with the cylinder orifices etched in it of the characteristic size 2 microns in diameter and mean distance of 4 microns between the orifices located periodically in two in-plane directions. Mobility was measured in temperature range from 2 K to 0.5 K at various thicknesses of a helium film covering the substrate, surface electron density, amplitude and frequency of a driving electric field in the plane of electron layer. The results obtained demonstrate the strong dependence of surface electron transport characteristics on the ratio between electron density and mean orifice surface concentration.