

Influence of Damaging Electric Fields on Melting of the 2D Electron Crystal

K. Nasyedkin and V. Syvokon

B.Verkin Institute for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine

The liquid-crystal phase transition of two-dimensional (2D) electron system over a liquid helium surface is studied experimentally. Two AC electric potentials are used in the experiment. The first one with frequency 3 MHz and low amplitude is used for transport properties measurements. The second one (damaging potential) has substantially higher amplitudes (50 - 300 mV) and frequency 40 MHz. The phase transition was observed as abrupt change of both components of the electron layer response to AC exciting voltage depending on temperature. The damaging potential is found to shift the phase transition to the lower temperatures. The damaging potential of about 300 mV suppress the transition to the ordered state. One of possible explanations is overheating 2D electron system by driving damaging electric field.