

### **The conductivity anomalies at electron polaron formation in gas phase on helium layer over structured substrate**

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The temperature and conductivity anomalies at autolocalization of surface electrons (SE) in gas phase over helium film covering structured by pores Si-substrate are investigated. The anomalies are expressed in lowering conductivity under formation of SE polaron state. The helium film was formed in both saturated and non-saturated conditions.

The electron subsystem over substrate is connected thermally with thermometer and others elements of the chamber of cell by means superfluid film. The chamber and  $^3\text{He}$  refrigerator in vacuum vessel present analog of calorimeter where main contribution is from heat capacity of liquid  $^3\text{He}$ .

In present work, we analyze electrostatically the cylindrical pore and consider distribution of electron density at this inhomogeneity of the substrate. According to analysis, electrons are localized over thin film on the surface of pores.

The experimental investigation of conductivity anomalies is performed by monitoring conductivity of SE and temperature of cell at heating of chambers. The change of conductivity was about two order of value. We also observed the little, about several mK, the change of thermometer temperature in temperature range of formation of electron polaron.

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2. *V. A. Nikolaenko, A. V. Smorodin, and S. S. Sokolov*, Possible formation of autolocalized state of quasi-one-dimensional surface electrons in dense helium vapor // Low Temp. Phys. **37**, 119 (2011).