

DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

Today electronics is developing rapidly because of researches in different fields of science. Physics of semiconductors is especially important in this case. An additional aspect is the development of mathematics and numerical methods. This research project concerns the study of a new type of tunnel junctions, both experimental and theoretical. Tunnel junctions are used in such semiconductor devices as solar cells and light emitters. Its operating is based on placing side by side two semiconductor layers differently doped. Electrons conduct in one layer while holes (a deficit of electrons with a positive charge) conduct in the second layer. In the framework of this project we are going to develop a model of tunnel junctions with low resistance, which is related to polarization effect in gallium nitride (GaN) and its doping by proper atoms. We are going to develop the physical model, which allows us to predict current-voltage characteristics for such junctions. This model will be built on the basis of experimental results and will simulate operating of real GaN-based tunnel junctions.