

Transport Properties of SOI MOS Transistors

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Si-based metal-oxide-semiconductor field-effect transistors (MOSFETs) are widely used in high-density integrated circuits for amplifying and switching electronic signals. MOS transistors produced by the silicon on insulator (SOI) technology yield a high switching speed, reduced power consumption and provide a flexible architecture by varying such parameters as thickness of a Si layer and buried oxide layer, substrate doping and back gate voltage. Due to the device structure and ability to form conductive front and back channels for electrons (holes) under applying a certain voltage to the upper and back gate, the MOSFET systems find its application for modeling a 2-dimensional electron (hole) gas (2DEG, 2DHG) in charge transport research. Electron transport properties of the SOI MOS transistors at low temperatures were studied. Possible electronic processes and electron scattering mechanisms in the channels are discussed.

Topics

Session A. Physics of condensed matter and spectroscopy

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