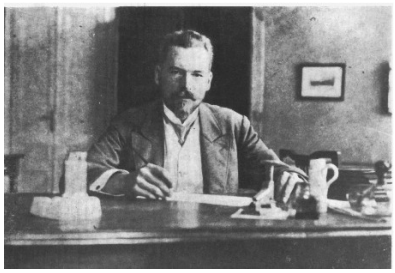

Contribution ID: **45** Type: **Poster**

Time-of-flight characteristics of dispersive transport in aligned quantum wires with fractal disorder

Dispersive transport of photo-injected carriers in arrays of vertically aligned fractal nanowires is considered. The conditions of the time-of-flight experiment are assumed. Photocurrent response after injection of non-equilibrium carriers by the short light pulse is studied. Carriers are injected instantaneously from the left side of the array, then, move along wires under the action of a strong longitudinal electric field. Within the generalized Scher-Montroll model taking the power-law distribution of distances between traps into account, we calculate charge carrier densities and transient current for different cases. The simplest case implies one-sided instantaneous jumps (tunneling) between neighboring localized states. In addition, we consider the role of backscattering, spatial correlations induced by quenching of disorder and spatiotemporal non-locality produced by fractal trap distribution and the finite velocity of motion between localized states. Analyzing power law exponents of transient current decay and dependence of time-of-flight on sample width, we establish criteria which allow determining the fractal dimension of trap distribution along a wire and parameters of waiting time distribution from the characteristics observed in the time-of-flight experiment.

Summary

Primary author: SIBATOV, Renat (Ulyanovsk State University)

Presenter: SIBATOV, Renat (Ulyanovsk State University)

Session Classification: Session 8