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1.5.4 Analysis of subdiffusion distributions1.5.5 Discussion; 2. Fractional kinetics of dispersive transport; 2.1 Macroscopic phenomenology; 2.1.1 A role of phenomenology in studying complex systems; 2.1.2 Universality of transient current curves; 2.1.3 From self-similarity to fractional derivatives; 2.1.4 From transient current to waiting time distribution; 2.2 Microscopic backgrounds of dispersive transport; 2.2.1 From the Scher-Montroll model to fractional derivatives; 2.2.2 Physical basis of the power-law waiting time distribution; 2.2.3 Multiple trapping regime
2.2.4 Hopping conductivity2.2.5 Bassler's model of Gaussian disorder; 2.3 Fractional formalism of multiple trapping; 2.3.1 Prime statements; 2.3.2 Multiple trapping regime and Arkhipov-Rudenko approach; 2.3.3 Fractional equations for delocalized carriers; 2.3.4 Fractional equation for the total concentration; 2.3.5 Two-state dynamics; 2.3.6 Delocalized carrier concentration; 2.3.7 Percolation and fractional kinetics; 2.3.8 The case of Gaussian disorder; 2.4 Some applications; 2.4.1 Dispersive diffusion; 2.4.2 Photoluminescence decay; 2.4.3 Including recombination; 2.4.4 Including generation
2.4.5 Bipolar dispersive transport2.4.6 The family of fractional dispersive transport equations; 3. Transient processes in disordered semiconductor structures; 3.1 Time-of-flight method; 3.1.1 Transient current in disordered semiconductors; 3.1.2 Transient current for truncated waiting time distributions; 3.1.3 Distributed dispersion parameter; 3.1.4 Transient current curves in case of Gaussian disorder; 3.1.5 Percolation in porous semiconductors; 3.1.6 Non-stationary radiation-induced conductivity; 3.2 Non-homogeneous distribution of traps
3.2.1 Non-uniform spatial distribution of localized states

Sommario/riassunto

The standard (Markovian) transport model based on the Boltzmann equation cannot describe some non-equilibrium processes called anomalous that take place in many disordered solids. Causes of anomality lie in non-uniformly scaled (fractal) spatial heterogeneities, in which particle trajectories take cluster form. Furthermore, particles can be located in some domains of small sizes (traps) for a long time. Estimations show that path length and waiting time distributions are often characterized by heavy tails of the power law type. This behavior allows the introduction of time and space derivative