



KONWERSATORIUM INSTYTUTU FIZYKI UMCS

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“Quench dynamics of superconducting nanostructures”

Recent development of the time-resolved spectroscopies (to picosecond precision) allows to probe dynamical processes imposed by the intrinsic effects or driven by the external potentials, giving an insight into the characteristic energy-scales realized in various systems of our interests. We study them here in a nanoscopic heterostructure, comprising the single and/or double quantum dot(s) embedded between the superconducting and metallic electrodes. We analyze the response of such setup to: (i) abrupt voltage applied across the junction, (ii) sudden change of the quantum dot energy levels, and (iii) their periodic driving. We explore evolution of the Andreev bound states (originating from the superconducting proximity effect) and discuss their signatures observable in the time-dependent charge currents. We discuss efficiency of relaxation processes and investigate the Rabi-like quantum oscillations, their beating patterns and multi-photon features showing up in the tunneling conductance. These phenomena might play important role in future operations designed on the superconducting qubits, including their topological variants.

Uprzejmie zapraszam wszystkich pracowników, doktorantów i studentów Instytutu Fizyki.

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