

Seminář oddělení magnetik a supravodičů

Fyzikální ústav Akademie věd České republiky, v. v. i.

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Spectral and transport properties of a superconducting quantum dot system

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Hybrid superconductor - quantum dot systems like carbon nanotubes coupled to superconducting electrodes have attracted much attention in recent years. They provide an almost ideal system where the interplay between superconducting order and electronic correlations can be studied in a controlled way. Such systems can be modeled by a single-impurity Anderson model coupled to BCS superconducting leads. We use diagrammatic perturbation techniques in the Coulomb interaction to capture the relevant physical phenomena, particularly the effect of the Coulomb interaction on the Andreev bound states present within the superconducting gap. Results of the Hartree-Fock approximation, second-order perturbation theory and the random phase approximation are presented.