School of Nano Science

School of PHYSICS

IPM Condensed Matter & Statistical Physics Group

Weekly Seminar

Towards more stable and longer-lived superconducting qubits

Speaker:

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Abstract:

Superconducting qubits are promising candidates to implement quantum information processing. Single-electron-like excitations in superconductors, known as quasiparticles, are generally detrimental to the operation of superconducting devices; in particular, they can reduce the qubit performance by causing relaxation. While it is not yet possible to prevent generation of non-equilibrium quasiparticles, keeping them away from active elements of the qubit provides a viable way of improving the device performance. I explain a recently developed model [1] for the effect of a single small normal-metal trap on the dynamics of the excess quasiparticles injected in a transmon-type qubit. Using this model, I study both the decay rate of excess quasiparticles and the steady-state density in realistic configurations. By optimizing the traps placement the decay rate can be enhanced and at the same time the steady-state density suppressed, which could lead to more stable and longer-lived qubits.

[1] R.-P. Riwar, A. Hosseinkhani, L. D. Burkhart, Y. Y. Gao, R. J. Schoelkopf, L. I. Glazman, G. Catelani. Normal-metal quasiparticle traps for superconducting qubits. arXiv:1606.04591 (in production process, PRB).

Wednesday, 7th of Mehr (1395) (September 28th, 2016), 18:00-19:00

Farmaniyeh seminar room