



Superconductor-insulator transition in sub-10 nm nanowires

Alexey BEZRYADIN (bezryadi@illinois.edu)
University of Illinois, USA

As the diameter of a thin superconducting wire (nanowire) is reduced, its critical temperature diminishes and a transition to an insulating regime is observed. Such transition appears to be a quantum superconductor-insulator transition (SIT) [1].

The SIT in nanowires shows similarities to the Schmid-Bulgadaev transition [2] predicted and observed in superconductor-insulator-superconductor junctions, in which case the critical point is controlled by a normal shunting resistor.

Various factors influencing the superconducting characteristics of the nanowire will be discussed, including the effect of the surface spins and the homogeneity.

[1] A.T. Bollinger, R.C. Dinsmore III, A. Rogachev, and A. Bezryadin, Phys. Rev. Lett. 101, 227003 (2008).

[2] P. Werner and M. Troyer, Phys. Rev. Lett. 95, 060201 (2005).