Abstract for an Invited Paper
for the MAR09 Meeting of
The American Physical Society

Thermally activated phase slips in superconducting nanowires

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We reanalyze the problem of thermally activated phase slips which can dominate the behavior of sufficiently thin superconducting wires at temperatures close to T_c. With the aid of an effective action approach we evaluate the TAPS rate which turns out to exceed the rate found by McCumber and Halperin, Phys. Rev. B 1, 1054 (1970) within the time-dependent Ginzburg-Landau analysis by the factor 1/(1-T/TC). Additional differences in the results of these two approaches arise at bias currents close to the Ginzburg-Landau critical current where the TAPS rate becomes bigger. We also derive a simple formula for the voltage noise across the superconducting wire in terms of the TAPS rate. Our results can be verified in modern experiments with superconducting nanowires.