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Full counting statistics of quantum phase slips

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In our talk we present a microscopic theory describing complete statistics of voltage fluctuations generated by quantum phase slips (QPS) in superconducting nanowires. We evaluate the cumulant generating function and demonstrate that shot noise of the voltage as well as the third and all higher voltage cumulants differ from zero only due to the presence of QPS. In the zero-frequency limit voltage fluctuations in superconducting nanowires are described by Poisson statistics just as in a number of other tunneling-like problems. However, at non-zero frequencies quantum voltage fluctuations in superconducting nanowires become much more complicated and are not anymore accounted for by Poisson statistics. In the case of short superconducting nanowires we explicitly evaluate all finite-frequency voltage cumulants and establish a non-trivial relation between these cumulants and the current-voltage characteristics of our system.

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