Physikalisches Kolloquium

Universität Konstanz

Di 16.05.23
15:15 Uhr
P 603
im Anschluss Getränke und Snacks

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Time-domain (phase resolved) photo-assisted quantum noise

Photo-assisted noise in mesoscopic devices, i.e. the effect of an ac excitation on the current-current correlator in a phase-coherent conductor, has attracted a long lasting, both experimental and theoretical interest. The effect of a time-dependent voltage V(t) of various shape has been observed on the finite frequency noise in many quantum systems. The same ac excitation has been shown to induce correlations between currents at different frequencies, leading to the generation of squeezed vacuum in the microwave domain. In all these experiments, the effect of the ac voltage can be accounted for by a simple formula which is enlightening in time-domain: the correlation between currents at times t and t' is multiplied by the cosine of the flux (i.e. the integral of eV(t)/h over time) between t and t'. This formula has never been experimentally checked for a time-dependent voltage.

Here we provide the time-domain measurement of current-current correlators synchronously with an ac sinusoidal excitation at frequency 4GHz. This allows us to explore correlations in current fluctuations inside a single excitation period, to define phase-dependent noise and deduce noise susceptibilities and time/frequency Wigner functions, all in agreement with theory.

Host: Prof. Belzig

Organisation: Prof. Bechinger