EINLADUNG
ZUM LASER- UND QUANTENOPTIKSEMINAR

Am Freitag, 05.07.2013 um 10:00 Uhr
Raum 46/387-388

Es spricht: Dipl.-Phys. Joachim Schäfer
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Thema:
“Information transmission through bosonic Gaussian channels”

Quantum channels play a key role in quantum information theory. In particular, bosonic Gaussian channels model most physical communication links, such as optical fibers or free space information transmission. One of the central characteristics of quantum channels is their classical capacity, i.e. the maximal amount of classical information (=bits) that can be transmitted per use of the channel. An important lower bound on the classical capacity is given by the Gaussian capacity, which is the maximal transmission rate achieved by Gaussian encodings. This type of encoding is very relevant for experimental implementations, easier to work with analytically, and in addition, conjectured to be optimal.

We study the Gaussian capacity for an arbitrary single-mode Gaussian channel. We show that the most general case can be reduced to a newly defined fiducial channel, which depends only on three parameters. Furthermore, the fiducial channel is simply realizable with a beam splitter, two identical single-mode squeezers, and a two-mode squeezer. Above a certain input energy threshold we provide an analytical expression for the Gaussian capacity, exploiting its additivity, and prove that the classical capacity cannot exceed it by more than 1/ln2 bits. Below the threshold we find an implicit solution expressed by a closed equation and study in details the properties of the solution as a function of the channel parameters.


Der Gast wird betreut von Prof. Dr. H. Ott

GÄSTE SIND HERZLICH WILLKOMMEN!