MP 8: Quanten-Informationstheorie

Zeit: Donnerstag 17:00–18:00 Raum: KGI-HS 1023

MP 8.1 Do 17:00 KGI-HS 1023

A not-so-normal mode decomposition — •Michael Wolf — Max-Planck-Institut für Quantenoptik, Hans-Kopfermann-Str.1, 85748 Garching

We provide a generalization of the normal mode decomposition for non-symmetric or locality constrained situations. This allows for instance to locally decouple a bipartitioned collection of arbitrarily correlated oscillators up to elementary pairs into which all correlations are condensed. Similarly, it enables us to decouple the interaction parts of multi-mode channels into single-mode and pair-interactions where the latter are shown to be a clear signature of squeezing between system and environment. In mathematical terms the result is a canonical matrix form with respect to real symplectic equivalence transformations. Applications in quantum information theory are outlined.

MP 8.2 Do 17:20 KGI-HS 1023

Haag duality of infinite quantum spin chains — •Michael Keyl[1], Taku Matsui[2], Dirk Schlingemann[1], and Reinhard F. Werner[3] — [1]ISI Foundation, 10133 Torino, Italy — [2]Graduate School of Mathematics, Kyushu Univ, 1-10-6 Hakozaki, Fukuoka 812-8581, Japan — [3]Institut für Mathematische Physik, TU Braunschweig, 38106 Braunschweig, Germany

In this talk we consider an infinite spin chain as a bipartite system consisting of the left and right half-chain and analyze Haag duality with respect to this splitting. Using Cuntz algebra methods we will show in particular that each pure, translational invariant state satisfies Haag duality. In addition the importance of this condition for entanglement theory of quantum spin systems is discussed.

[1] M. Keyl, T. Matsui, D. Schlingemann, R. F. Werner, Entanglement, Haag-duality and type properties of infinite quantum spin chains, Rev. Math. Phys. 18, no. 9, 935-970 (2006)

[2] M. Keyl, T. Matsui, D. Schlingemann, R. F. Werner, On Haag duality for pure states of quantum spin chains, math-ph/0703013

MP 8.3 Do 17:40 KGI-HS 1023

A Continuity Theorem for Stinespring's Dilation — Dennis Kretschmann[2,3], •Dirk-Michael Schlingemann[1,3], and Reinhard F. Werner[3] — [1]ISI Foundation Torino, Quantum information theory unit, Italy — [2]Quantum Information Theory Group, Dipartimento di Fisica A. Volta, Universita di Pavia, Italy — [3]Institut f. Mathematische Physik, TU-Braunschweig, Germany

We report on our article [arXive:0710.2495] in which we show a continuity theorem for Stinespring's dilation: two completely positive maps between arbitrary C*-algebras are close in cb-norm iff we can find corresponding dilations that are close in operator norm. The proof establishes the equivalence of the cb-norm distance and the Bures distance for completely positive maps. We also discuss applications to topics in quantum information theory, e.g., information-disturbance tradeoff and quantum bit commitment.