Celebrating the
Choi-Jamiołkowski Isomorphism
Online Event
March 1-2, 2023
(Endorsed by the National Center for Quantum
Informatics (KCIK), Gdańsk)

$\langle KC|K \rangle$

Contribution ID: **5**   Type: **not specified**

A generic quantum Wielandt's inequality

Thursday, 2 March 2023 15:00 (30 minutes)

In this talk, I will provide a generic version of quantum Wielandt's inequality, which gives an optimal upper bound on the minimal length such that products of that length of n-dimensional matrices in a generating system span the whole matrix algebra with probability one. I will show that this length generically is of order $\Theta(\log n)$, as opposed to the general case, in which the best bound to the date is $O(n2\log n)$. We will discuss the implications of this result as a new bound on the primitivity index of a random quantum channel, as well as to show that almost any translation-invariant (with periodic boundary conditions) matrix product state with length of order $\Omega(\log n)$ is the unique ground state of a local Hamiltonian. Finally, we will comment on the possibility of extending these results to Lie algebras. This is based on joint work with Yifan Jia.

Primary author: CUEVAS, Angela Capel (Fachbereich Mathematik, Universität Tübingen, 72076 Tübingen, Germany)

Presenter: CUEVAS, Angela Capel (Fachbereich Mathematik, Universität Tübingen, 72076 Tübingen, Germany)