

Training and Development

PLUS+ TRAINING AND DEVELOPMENT PROGRAM: Four Assorted Quantum Pieces

DR. KAROL ŻYCZKOWSKI

May 11, 2021

10:00 to 12:00

Online (Zoom)

Talk 4. Quantum designs and Absolutely Maximally Entangled (AME) states.

An AME state of a system consisting of $2k$ parties is distinguished by the fact that for any splitting of the system into two parts with k subsystems each, both parts are maximally entangled. Such states, useful to construct quantum error-correction codes and teleportation schemes, are known for several systems including four systems with $N=3,4,5,7,8,\dots$ levels each and a six-qubit system. We show that the AME(4,6) state of four subsystems with six levels each exists and present an analytical solution, equivalent to a 2-unitary matrix of order 36 and a perfect tensor with 4 indices running from one to six [4]. Furthermore, it yields a quantum error correcting $((3,6,2))_6$ code and can be considered as a quantum solution of the famous 36-officers problem of Euler with entangled officers. W

tend to believe this result will trigger further research in the field of quantum designs and quantum combinatorics

[4] S. A. Rather, A. Burchardt, W. Bruzda, G. Rajchel-Mieldzio?, A. Lakshminarayan, and . ?yczkowski, Thirty-six entangled officers of Euler and a quhex quantum error correcting code, preprint, April 2021

Due to recommendations in place to contribute containing the spreading of COVID-19, the

Theory Lectures will be carried out remotely via Zoom. In case you want to receive an invitation to attend the online session, you can send an email to Alba.Berenguer@icfo.eu

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