Workshop on Methods and Applications of Quantum Computing with Light and Qubits

Report of Contributions

Contribution ID: **2**   Type: **not specified**

Gaussian Boson Sampling

Tuesday, 17 October 2023 09:20 (45 minutes)

Presenter: HAMILTON, Craig

Session Classification: Morning session

Contribution ID: **3**   Type: **not specified**

What we do in the shadows (in Olomouc)

Tuesday, 17 October 2023 10:05 (20 minutes)

Presenter: PROVAZNÍK, Jan (Palacký University, Olomouc)

Session Classification: Morning session

Contribution ID: 4   Type: **not specified**

Two-particle Hadamard quantum walk on dynamically percolated line

Tuesday, 17 October 2023 09:00 (20 minutes)

During a quantum walk on a dynamically percolated graph, some of the graphs' edges can randomly break and reappear again at every time step of the walk. So, dynamical percolations present a possibility to simulate the evolution of systems with imperfections. Although they are generally difficult to study, it is possible to analytically investigate the asymptotic evolution of such systems. Using the formalism introduced in this talk several interesting properties of dynamically percolated systems for single-walker quantum walks have already been revealed. Namely, for some graphs, the possibility of broken edges can cause an improvement in the systems' transport properties. In this talk we present the results for the case of two walkers in one dimension, namely for the special case of dynamically percolated Hadamard walk.

Presenter: PARÝZKOVÁ, Magdalena

Session Classification: Morning session

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

Single-qubit gate teleportation provides a quantum advantage

Tuesday, 17 October 2023 10:40 (45 minutes)

Presenter: CAHA, Libor (Technical University of Munich)

Session Classification: Morning session

Contribution ID: **6**   Type: **not specified**

Iterated non-linear maps of qubit states

Tuesday, 17 October 2023 11:25 (45 minutes)

Presenter: JEX, Igor (FNSPE CTU in Prague)

Session Classification: Morning session

Contribution ID: **7**

Type: **not specified**

Report from NTU hackathon: lessons and experiences

Tuesday, 17 October 2023 14:00 (45 minutes)

Presenters: KŘÍŽ, Antonín; GÁBRIS, Aurél (Czech Technical University in Prague); KRÁTKÁ, Eliška; KUČERA, Jakub

Session Classification: Afternoon session

Contribution ID: **8**   Type: **not specified**

SQUANDER: a classical framework to train quantum circuits

Tuesday, 17 October 2023 14:45 (45 minutes)

In this presentation, I will introduce the SQUANDER quantum circuit training framework, which has been jointly developed by the Eötvös Loránd University and the Wigner Research Centre.

Presenter: RAKYTA, Péter (Eötvös Loránd university)

Session Classification: Afternoon session

Contribution ID: **9**   Type: **not specified**

The simples quantum codes

Tuesday, 17 October 2023 15:45 (30 minutes)

Presenter: ROZGONYI, Áron (Wigner RCP)

Session Classification: Afternoon session

Contribution ID: **10**

Type: **not specified**

Nonlinear squeezing as a non-Gaussian resource for quantum technologies

Tuesday, 17 October 2023 16:15 (45 minutes)

Quantum non-Gaussianity was recently recognized as an important resource for CV quantum information processing, which is necessary for some of the advanced applications, such as quantum computation. The non-Gaussian features of quantum states, often tied to negativity of their Wigner function, are difficult to implement experimentally. The most common experimental sources rely on photon number resolving measurements or interactions with qubit systems, which are both probabilistic approaches. In past we have suggested that one of the elementary non-Gaussian operations, cubic phase gate, can be realized deterministically in a measurement induced fashion if a proper ancillary quantum state is used. This ancillary state possesses a novel kind of non-Gaussianity - the nonlinear squeezing - defined as reduction of variance of a nonlinear combination of quadrature operators. In contrast to vague indicators of non-Gaussianity such as the negativity of Wigner function which is only necessary, the nonlinear squeezing is a sufficient operationally defined quantifier of non-Gaussianity that is directly tied to the performance of the deterministic non-Gaussian circuit. In this talk we present the basic theoretical concept and elementary behavior, several theoretical methods of preparation for quantum states with nonlinear squeezing, and the recent progress in experimental realization.

Presenter: MAREK, Petr (Palacky University)

Session Classification: Afternoon session