ETH
Eidgenössische Technische Hochschule Zürich
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Distributed Computing

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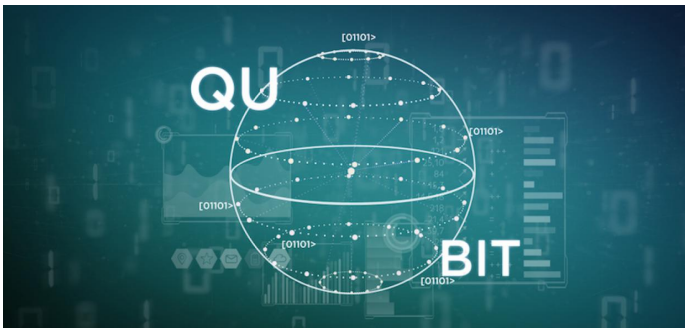
Quantum Inflation in Distributed Computing

In classical distributed computing models, each individual node can communicate with its neighboring nodes through a classical channel. The information they exchange is deterministic, a combination of bit 0 and bit 1. The complexity of communication in distributed computing model restrict the efficiency of algorithms. Therefore, a much powerful model has been used to solve tasks in distributed computing, i.e., quantum distributed model. In this model the nodes can use quantum processing and communicate with quantum bits (qubits): each edge of the network corresponds to a quantum channel (e.g., an optical fiber if qubits are implemented using photons).

Recently, several results showed that quantum communication offers significant advantages over classical communication. These techniques can accelerate solving many graph algorithms. A pressing open question is to understand for which problems in distributed computing can be helped by quantum communication. And whether lower bounds of many problems remain valid in the quantum setting.



In this project, we study how to solve quantum distributed computing problems with inflation technique. We will consider some special network structures and basic tasks in distributed computing and generalize algorithms under quantum distributed computing model.

Requirements: Interest in quantum physics or distributed computing. Familiarity with theoretical computer science would be beneficial.
We will have weekly meetings to address questions, discuss progress, and think about future ideas.

Interested? Please contact us for more details!

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