

Parallel Distributed Sparse Tree Algorithms

Master Thesis

At a glance

- Design and implement a parallel distributed sparse tree storage format and algorithms to apply operations on the tree
- Performance modeling and analysis of parallel scaling

Large-scale simulation of photonic quantum computers in Fock space require the handling of large distributed sparse M-ary trees of indices and values. ($M > 2$)

Given is a set of required operations on the tree and the main task of the thesis is to design, implement and analyze an efficient storage format and algorithms to apply the operations to the tree.

- No physics or quantum computing knowledge is required.
- Knowledge of parallelization strategies (OpenMP and MPI) is required.

Further reading:

- [https://en.wikipedia.org/wiki/Tree_\(graph_theory\)](https://en.wikipedia.org/wiki/Tree_(graph_theory))
- https://en.wikipedia.org/wiki/M-ary_tree

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