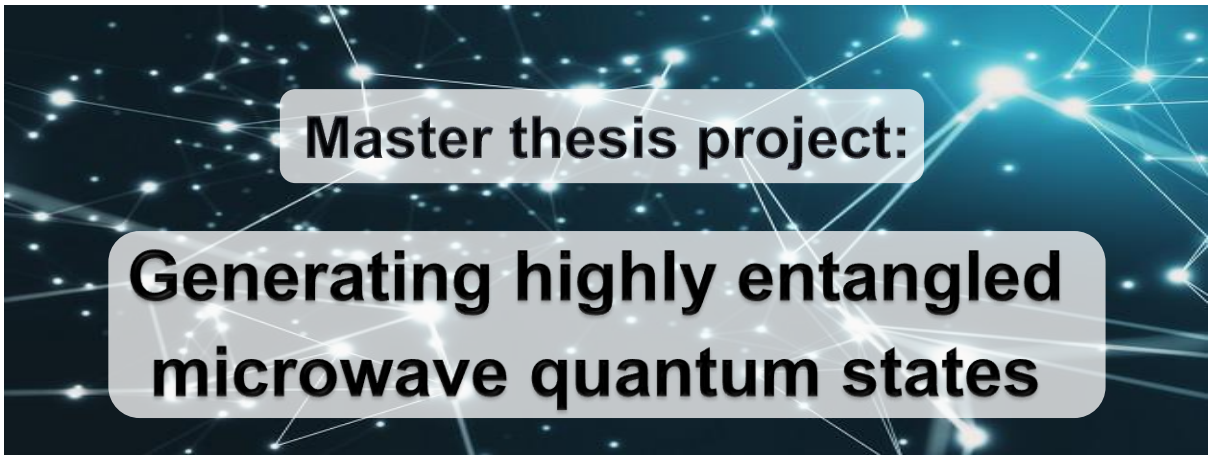

Background

Quantum computing is a hot topic, heavily invested in because of its potential to perform calculations that a classical computer could not do. Probably the most famous model of quantum computation is so-called gate-based quantum computing, where computations are performed by applying quantum gates on qubits.

But there is an alternative, equivalent model of quantum computation. It is called *measurement-based* quantum computing. In the measurement-based model, computations are carried out by performing measurements on special types of highly entangled states called *cluster states.*

As an alternative to qubits, information can also be encoded in quantum states of an electromagnetic field. So far, setups in the optical frequency domain have shown the most promise for the generation of cluster states. But now, experimental developments using superconducting circuits could enable the creation of microwave cluster states.

Project Description

A superconducting circuit capable of generating highly entangled microwave states is described by a particular Hamiltonian. This Hamiltonian has a number of free parameters that can be adjusted in an experiment, such as drive amplitudes. In this project, correlations generated by this Hamiltonian will be compared to correlations of an ideal cluster state, and the free Hamiltonian parameters will be optimized to generate a cluster state. This study models ongoing experiments at KTH. The results will be valuable in guiding our experimental colleagues to generate cluster states.

We are looking for someone that is interested in:

- Numerical optimization
- Applied quantum physics

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