CHALMERS
UNIVERSITY OF TECHNOLOGY

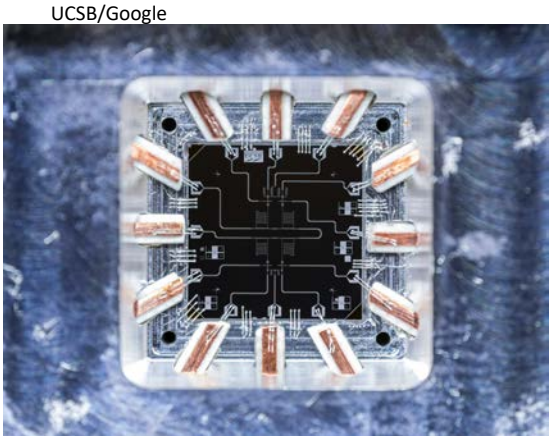
Master's thesis project at the Quantum Technology Laboratory, Department of Microtechnology and Nanoscience

Software for classical control of a multi-qubit processor

Motivation:

One of the most promising pathways of implementing quantum-computers is the use of superconducting microwave circuits. The control of such a computer requires precise timings of different microwave instruments in a scalable and controllable manner. Since many instruments are involved, all settings need to be managed via an instrument control and measurement automation software.

UCSB/Google



Zürich Instruments

Project description:

The project consist of developing so called instrument drivers for new arbitrary waveform generators and lockin amplifiers recently purchased in the Quantum Technology Laboratory. The outputs of these generators then need to be verified using both a high-speed oscilloscope as well as a live quantum processor. Once the correct output is established, optimization of the speed and scalability to more units is of high priority. The instrument control platform is Labber (http://www.labber.org), built using mainly Python. By working in a state of the art laboratory with the most recent hardware, the student will be familiar with advanced experimental setups that are useful for pursuing opportunities in both academia and industry. More information on quantum computing is available at http://www.chalmers.se/en/centres/wacqt/Pages/default.aspx

Prerequisites:

a. Course in object-oriented programming
b. Experience in Python
c. Courses or interest in microwave engineering, quantum physics, and experimental physics are not required, but are considered assets.

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