JÜLICH
Forschungszentrum

MSC PROJECT

Design and Maintenance of a Software Architecture for Cryogenic and Electronic Control of Quantum Experiments

The goal of this project is to build a flexible software package capable of serving different initial quantum experiments geared towards making spin and superconducting qubits. This project will help in making a coherent environment for researchers to interface with electronics and cryogenics from different manufacturers with different use cases. We currently work with spin and superconducting quantum computing systems on the same platform. The experiments we will be most interested in will be geared towards making and optimizing the building blocks (the individual qubits) necessary for a large-scale quantum computer.

You will be making a backbones package that we use to run all our experiments. You will be using existing software packages for smaller components and wrapping them with a convenient python program to allow for straightforward experiment design and monitoring. The latter part of your project will bring you exposure to databases and data management in an environment with multiple experiments being conducted at the same time and being stored in our servers.

1   Required Skills

To be part of this project, you must be comfortable with coding in multiple languages, working with build environments and software packaging. You must be able to work in a small team and collaborate with students working on diverse projects with the same setup. The exact requirements are:

- Self-motivated, independent working style
- Extensive experience with Python, C++, and some with the REST API
- Experience with build and build automation tools, like `gcc`, `cmake`, `make`
- Experience with databases, and database management
- Some level of comfort in working with a collaborative codebase

Experience with quantum control code is a nice to have, but not necessary. Any prior encounters with software packages like `qcodes`, `qiskit`, `zhinst` or `qupulse` are appreciated.

2   What we offer

As a new and exciting lab in the growing quantum computing landscape, you get first-hand experience working towards systems that build future qubit platforms. Additionally, you get:

- Modern workplace, workstation for duration of the project.
- Student assistant contract via RWTH, or equivalent via FZ Jülich contract
- Young, international, dynamical workplace, located on Campus Melaten (Campus-Boulevard 79)
- Exposure to leading research activities in quantum technology

3   Supervision

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