

Subject: Phase 1 - Dauris: Enhancing a simulator for quantum stabilizer circuits

Phase 1 Project Selection Status Report

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1.

Quantum error correction (QEC) is important because noise corrupts executions of quantum algorithms.

Being able to visualise QEC is very useful for checking correctness, understanding architecture requirements and for reproducing research results easily.

Stim is a fast stabilizer quantum simulator developed by Google, but it only supports qubits in 2D lattice shapes.

The project would involve first researching Stim's development as well as what additional features to support and the design - for example what other qubit shapes, what representation and how error correction should be done.

It would then involve developing an extension for Stim to be able support 1) additional physical qubit layouts, 2) additional QEC schemes (beyond surface codes) and 3) investigate how to visualize and model qubit layouts with defects.

2. Prakash Murali - agreed to supervise

3. N/A