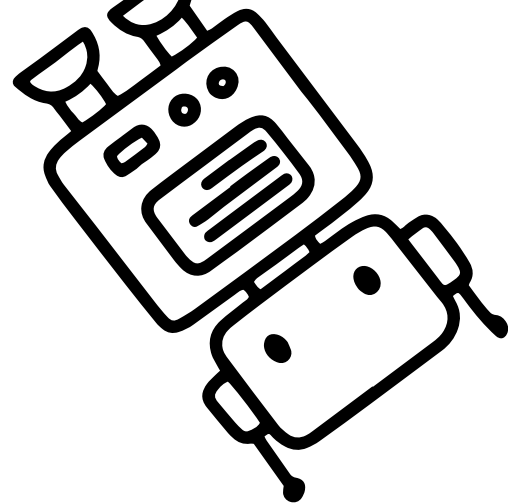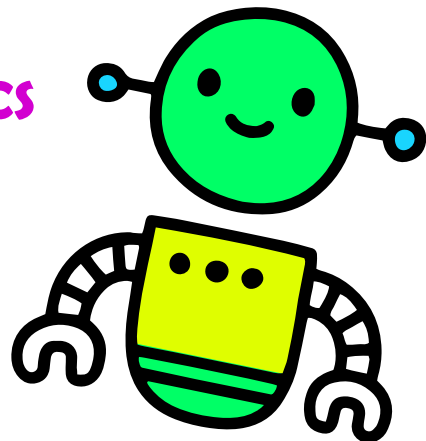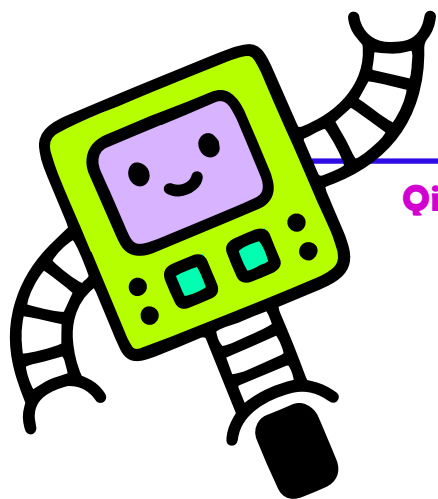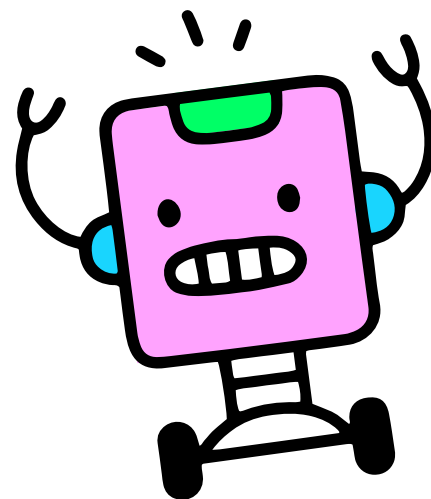**HAMILTONIAN HARMONICS**

presents

Adiabatic state preparation with Clifford gates
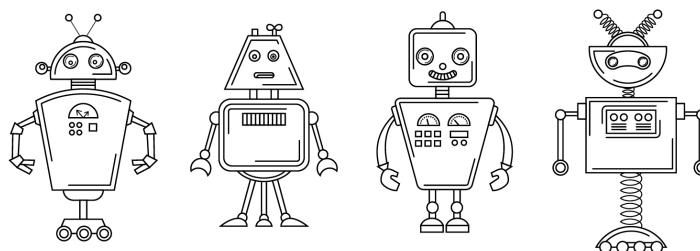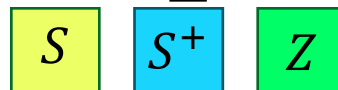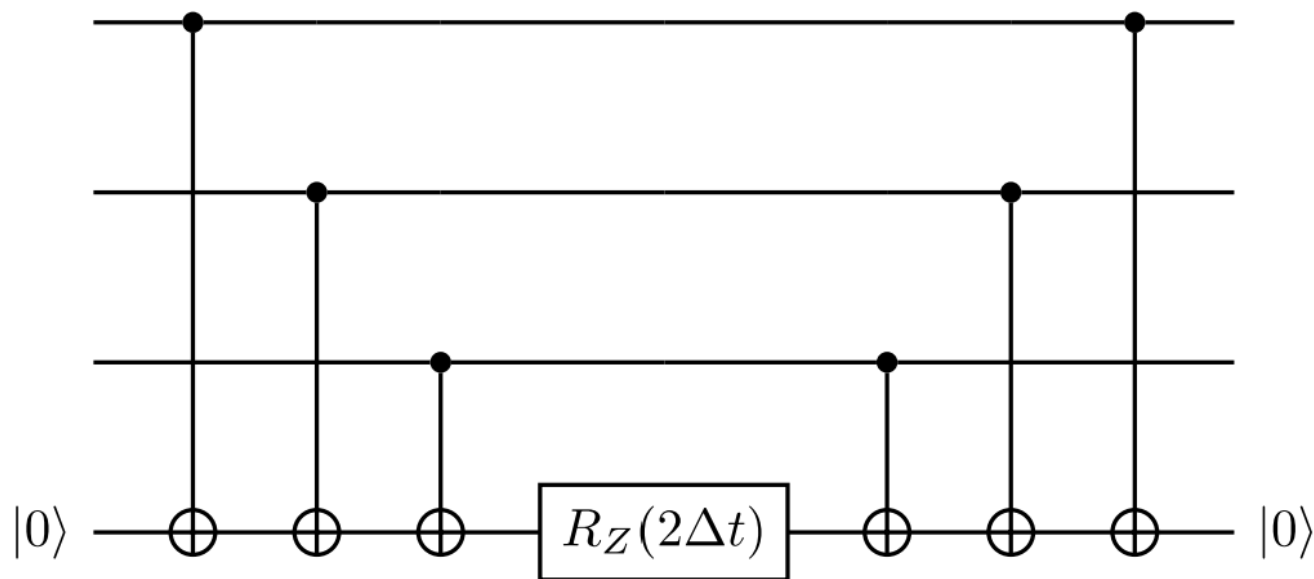
Qiskit Hackathon at World of Quantum 2023

Marc Maußner
Thierry Kaldenbach
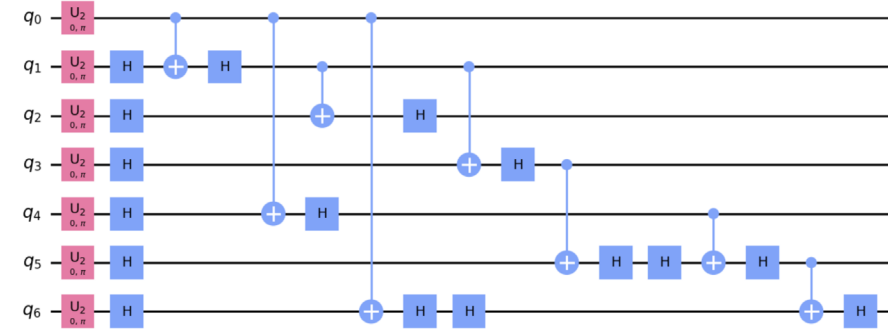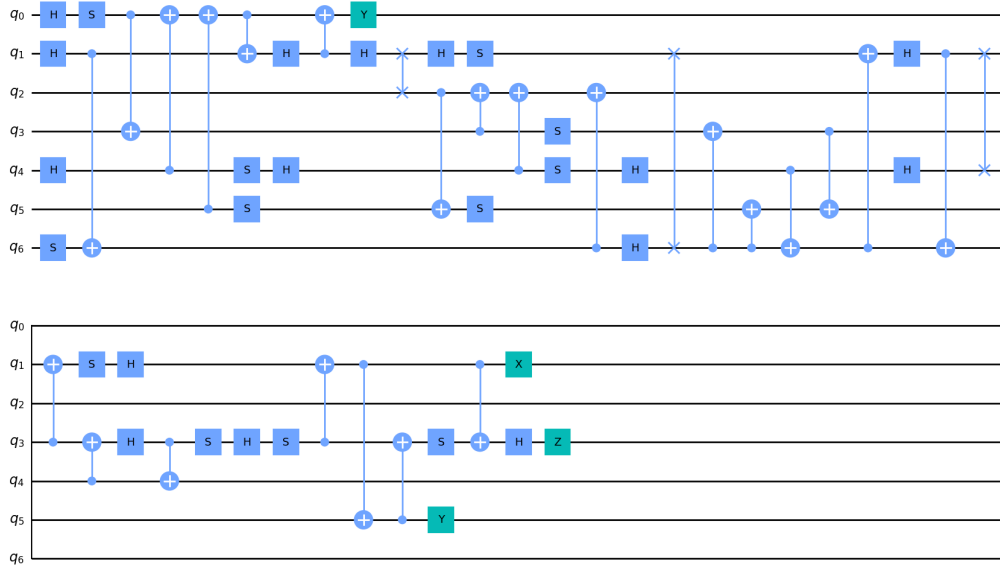Raphael Kopp
Lea Marlen Rektorschek

Hamiltonian Mixer

$$H(s) = (1-s)H_0 + sH_{int}$$

$$e^{-iZZZ\Delta t}$$
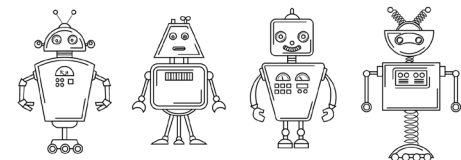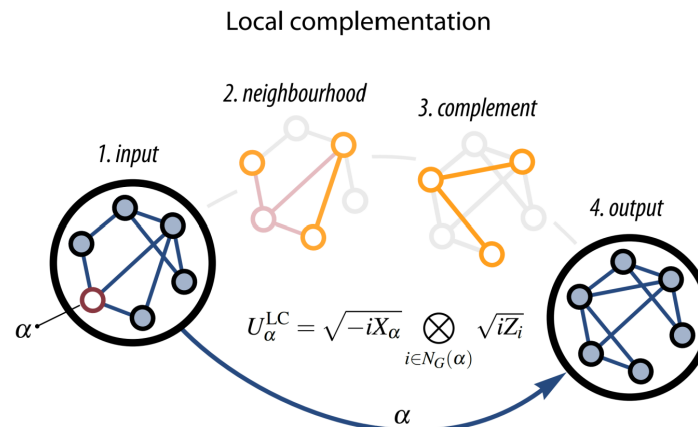
$$|0\rangle \quad R_Z(2\Delta t) \quad |0\rangle$$

S S^+ Z

Clifford Gates

Graph state simulator

Local complementation

1. input
2. neighbourhood
3. complement
4. output

$$U_\alpha^{\text{LC}} = \sqrt{-iX_\alpha} \bigotimes_{i \in N_G(\alpha)} \sqrt{iZ_i}$$

α

J. C. Adcock et al. "Mapping graph state orbits under local complementation". In: Quantum 4 (2020), p. 305.
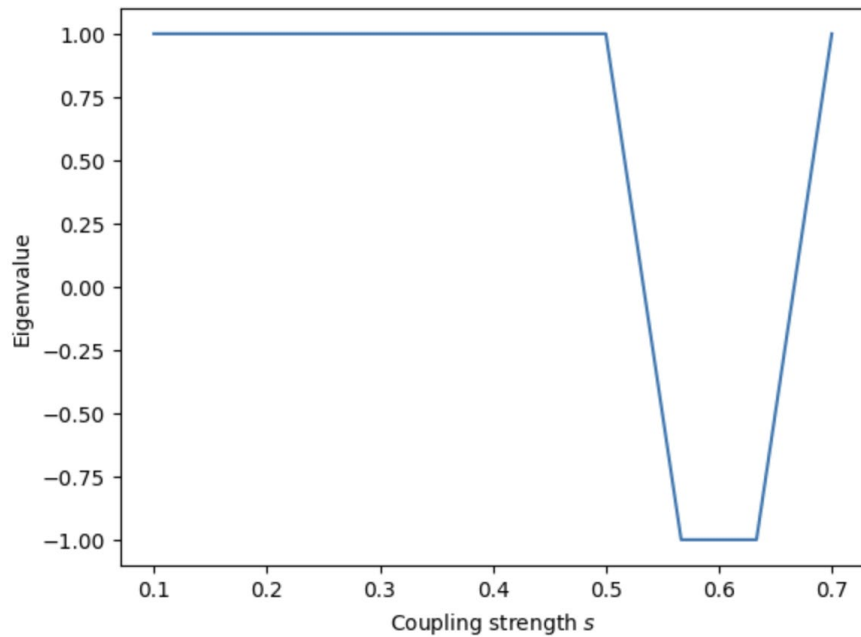
Results and Outlook

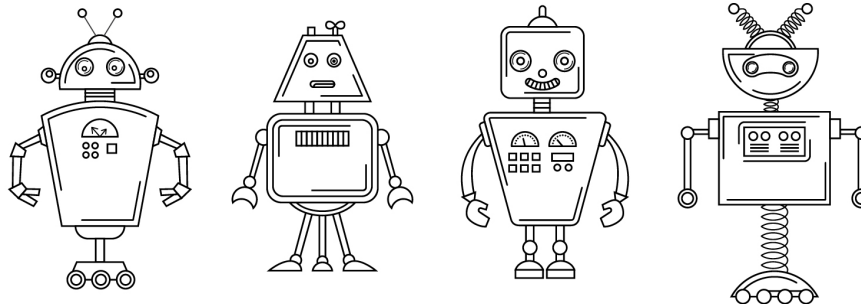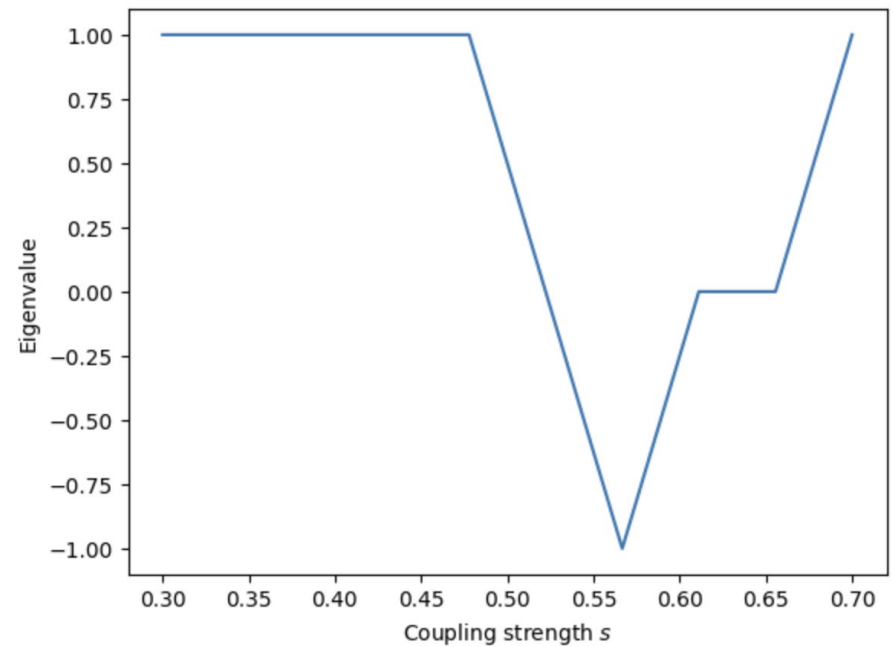**2 Qubit** $H_0 = Z_0 Z_1$

6 Qubit $H_0 = Z_0 Z_1 Z_2 Z_3 Z_4 Z_5$

Thank you for your attention!