GST Report

(Dated: May 17, 2024)

I. SETUP

- Name and date of the experiment: test, 17.01.2024
- Number of sequences: 200.
- Average shots per sequence: 208.
- **Rank: 1.**
- Number of free parameters: 22.
- Gate set:

{0: 'Idle-short', 1: 'Idle-long', 2: 'Rx(pi)', 3: 'Ry(pi)', 4: 'Rx(pi/2)', 5: 'Ry(pi/2)'}

II. ERROR MEASURES

Table I. Gate quality measures with errors corresponding to the 95th percentile over 2 bootstrapping runs.

	Average gate fidelity $\mathcal{F}_{\text{avg}}(\mathcal{U}_i, \hat{\mathcal{G}}_i)$	Diamond distance $\frac{1}{2}\|\|\mathcal{U}_i - \hat{\mathcal{G}}_i\|\|_\diamond$
Idle-short	0.9998 [0.9997,0.9997]	0.0306 [0.0421,0.0448]
Idle-long	0.9999 [0.9998,0.9999]	0.0264 [0.0268,0.0362]
Rx(pi)	0.9999 [0.9999,1.0000]	0.0190 [0.0116,0.0189]
Ry(pi)	0.9998 [0.9997,0.9998]	0.0386 [0.0324,0.0454]
Rx(pi/2)	0.9998 [0.9996,0.9997]	0.0381 [0.0454,0.0499]
Ry(pi/2)	0.9999 [0.9999,0.9999]	0.0211 [0.0197,0.0277]

Table II. State and measurement quality measures with errors corresponding to the 95th percentile over 2 bootstrapping runs.

Final cost	Mean TVD: estimate - data	Mean TVD: target - data	POVM - diamond dist.	State - trace dist.
0.0011 [0.0011,0.0016]	0.0266 [0.0244,0.0314]	0.0310 [0.0352,0.0362]	0.0109 [0.0308,0.0411]	0.0045 [0.0027,0.0159]

Table III. Normalized rotation axes coefficient. Errors correspond to the 95th percentile over 2 bootstrapping runs.

	Idle-short	Idle-long	Rx(pi)	Ry(pi)	Rx(pi/2)	Ry(pi/2)
α/π	0.010 [0.013,0.014]	0.008 [0.009,0.012]	0.997 [0.995,0.999]	0.999 [0.999,1.000]	0.491 [0.487,0.490]	0.497 [0.496,0.499]
n_X	-0.079 [-0.428,-0.268]	-0.327 [-0.009,0.029]	1.000 [1.000,1.000]	-0.019 [-0.022,-0.016]	-1.000 [-1.000,-1.000]	-0.013 [-0.013,-0.009]
n_Y	-0.409 [-0.510,-0.348]	-0.565 [-0.661,-0.381]	-0.006 [-0.006,-0.002]	1.000 [1.000,1.000]	0.013 [0.019,0.020]	-1.000 [-1.000,-1.000]
n_Z	0.909 [0.816,0.833]	0.758 [0.748,0.923]	0.005 [0.002,0.005]	-0.000 [-0.006,0.003]	0.014 [0.007,0.014]	0.003 [-0.004,0.015]

III. GATE AND SPAM PLOTS

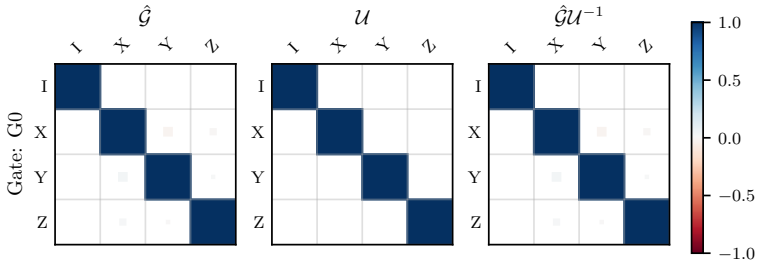

Figure 1. Process matrix in the Pauli basis with entries in $[-1, 1]$. Left side: GST reconstruction, center: ideal gate, right side: error channel (ideally the identity).

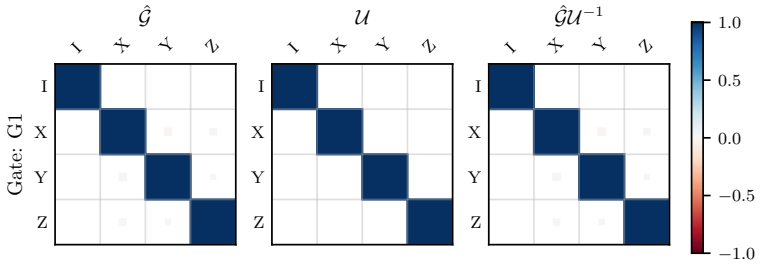

Figure 2. Process matrix in the Pauli basis with entries in $[-1, 1]$. Left side: GST reconstruction, center: ideal gate, right side: error channel (ideally the identity).

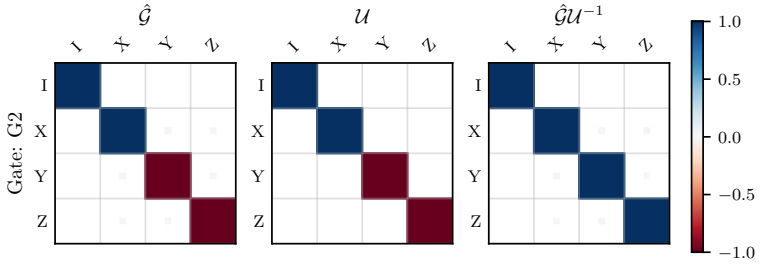

Figure 3. Process matrix in the Pauli basis with entries in $[-1, 1]$. Left side: GST reconstruction, center: ideal gate, right side: error channel (ideally the identity).

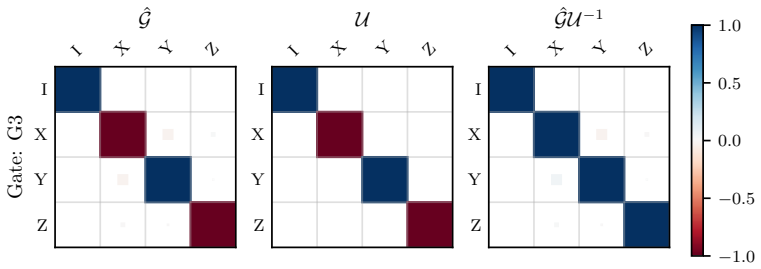

Figure 4. Process matrix in the Pauli basis with entries in $[-1, 1]$. Left side: GST reconstruction, center: ideal gate, right side: error channel (ideally the identity).

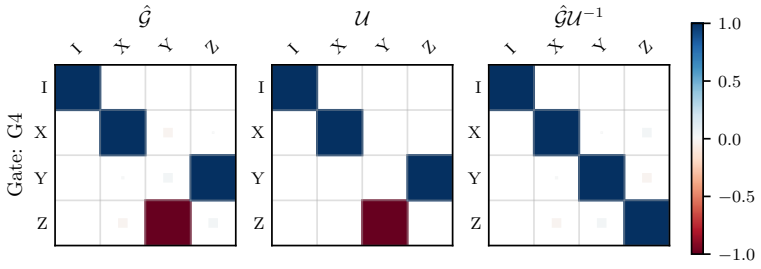

Figure 5. Process matrix in the Pauli basis with entries in $[-1, 1]$. Left side: GST reconstruction, center: ideal gate, right side: error channel (ideally the identity).

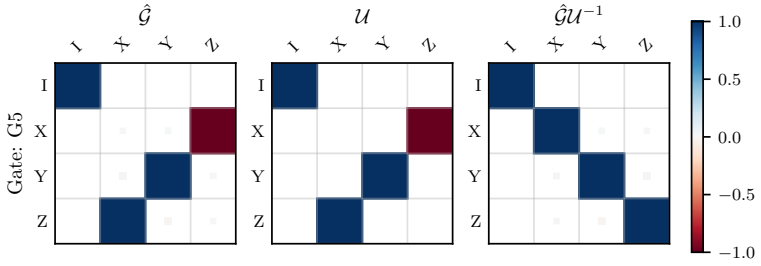

Figure 6. Process matrix in the Pauli basis with entries in $[-1, 1]$. Left side: GST reconstruction, center: ideal gate, right side: error channel (ideally the identity).

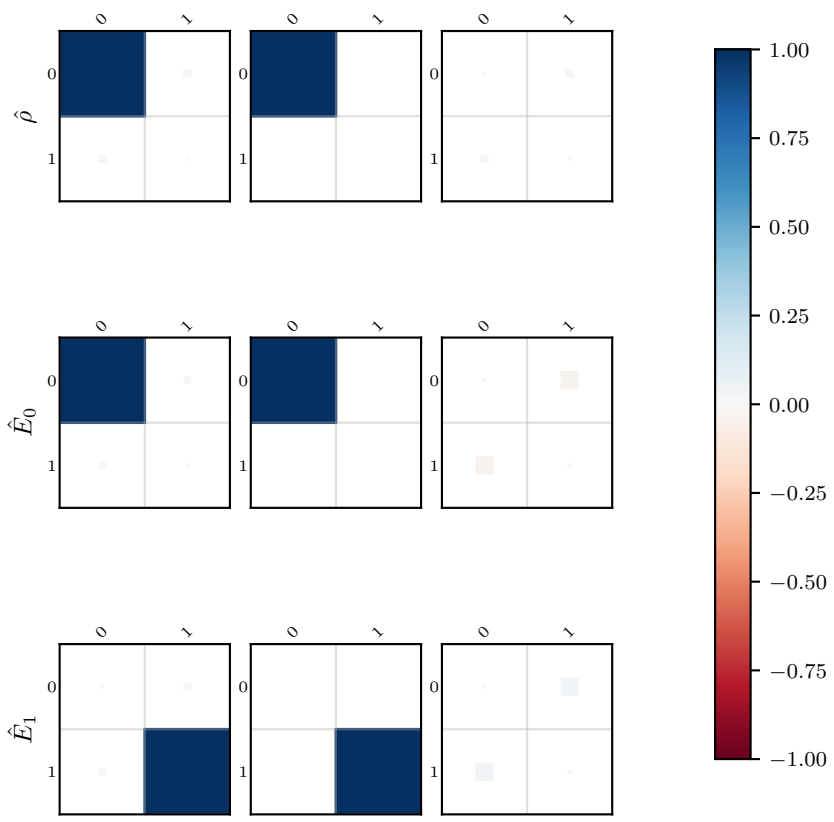

Figure 7. Left column: real part of state and measurement in standard basis, right column: magnified errors to ideal implementation $10 \cdot (\hat{\rho} - \rho_{\text{ideal}})$ and $10 \cdot (\hat{E}_i - E_{i,\text{ideal}})$.

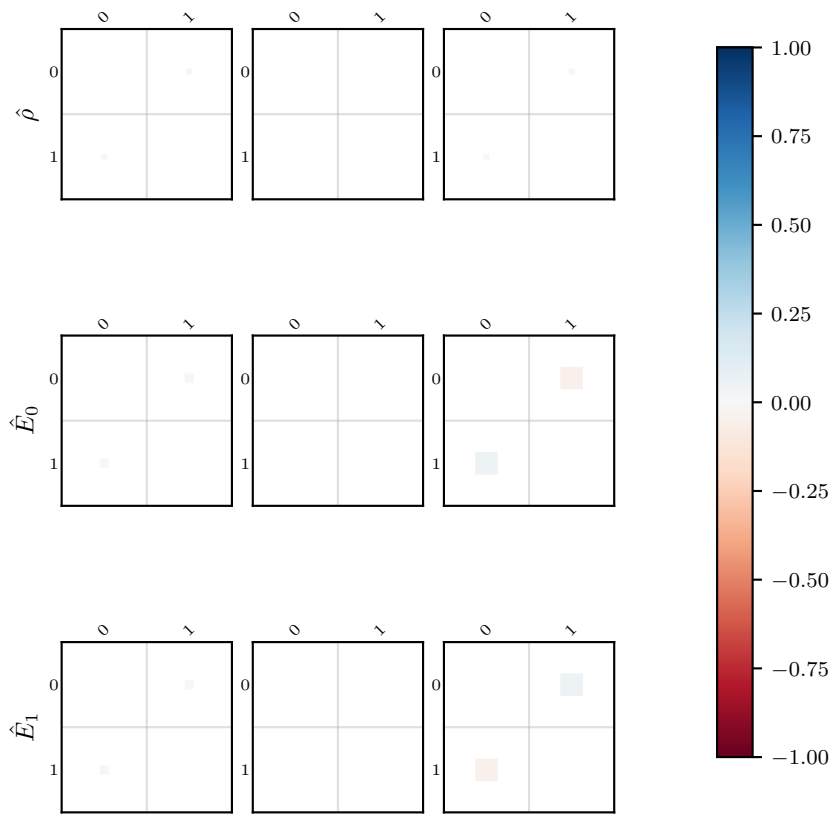

Figure 8. Left column: imaginary part of state and measurement in standard basis, right column: magnified errors to ideal implementation $10 \cdot (\hat{\rho} - \rho_{\text{ideal}})$ and $10 \cdot (\hat{E}_i - E_{i,\text{ideal}})$.