

Hardcoded vs Qiskit Pipeline Comparison Summary

```
generated_utc: 2026-02-14T02:09:29.613202+00:00
all_pass: False
l_values: [2, 3]
trajectory_comparison_basis: trotter trajectories start from
    each pipeline's selected initial_state_source (default: vqe)

thresholds:
{'doublon_trotter_max_abs_delta': 0.001,
 'energy_trotter_max_abs_delta': 0.001,
 'fidelity_max_abs_delta': 0.0001,
 'ground_state_energy_abs_delta': 1e-08,
 'n_dn_site0_trotter_max_abs_delta': 0.005,
 'n_up_site0_trotter_max_abs_delta': 0.005}

hardcoded_qiskit_import_isolation:
{'offending_imports': [],
 'pass': True,
 'qiskit_imports': [{"line": 307, "module": "qiskit"},
                    {"line": 308, "module": "qiskit.circuit.library"},
                    {"line": 309, "module": "qiskit.primitives"},
                    {"line": 310, "module": "qiskit.quantum_info"},
                    {"line": 311, "module": "qiskit.synthesis"},
                    {"line": 312, "module": "qiskit_algorithms"},
                    {"line": 313, "module": "qiskit_algorithms.minimum_eigensolvers"}],
 'qpe_adapter_range': {'end_line': 409, 'start_line': 292}},

Delta metric definitions:
ΔF(t)      = |F_hc(t) - F_qk(t)|
ΔE_trot(t) = |E_trot_hc(t) - E_trot_qk(t)|
Δn_up0(t)  = |n_up0_hc(t) - n_up0_qk(t)|
Δn_dn0(t)  = |n_dn0_hc(t) - n_dn0_qk(t)|
ΔD(t)      = |D_hc(t) - D_qk(t)|
```

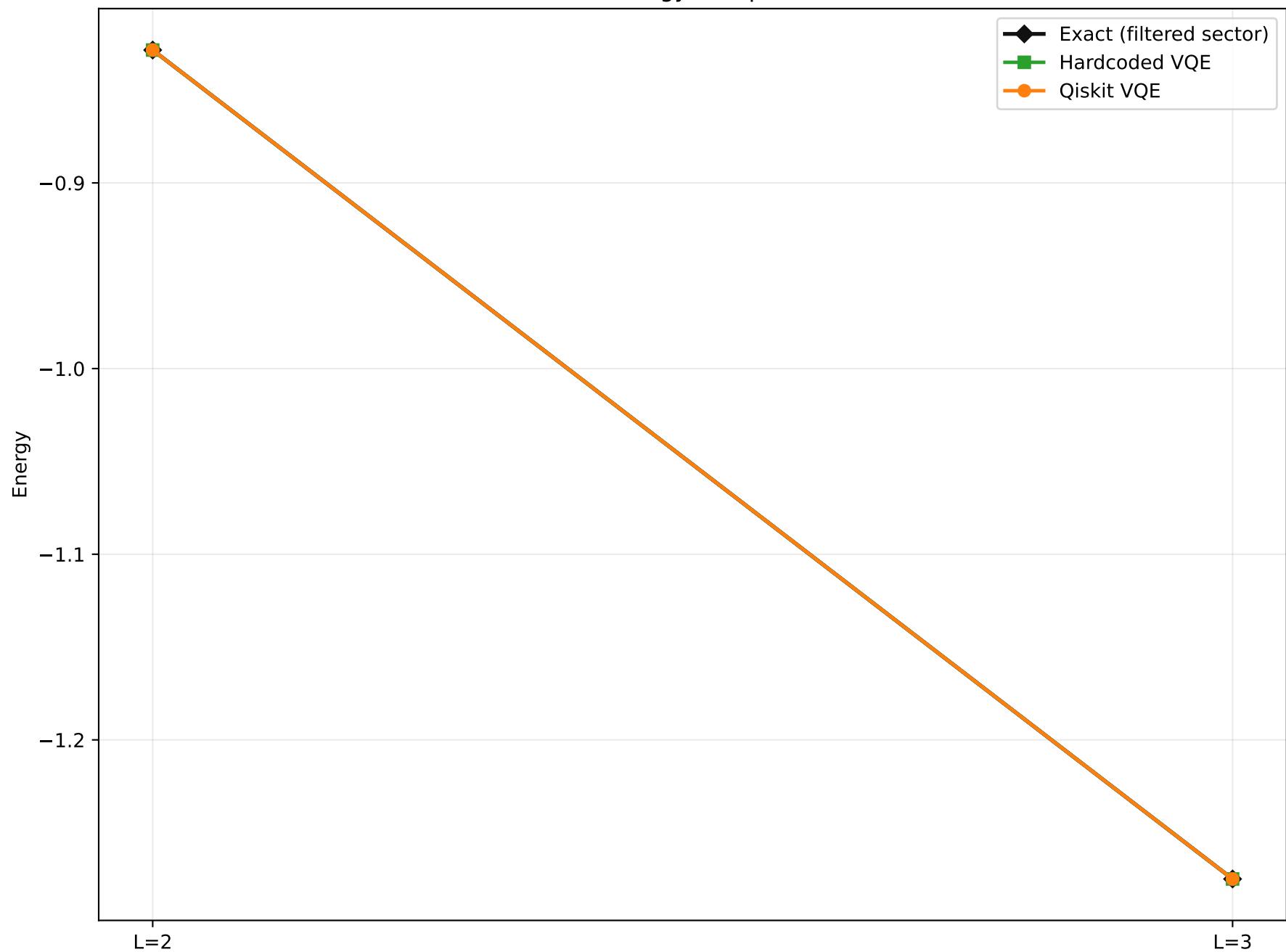
`F_pipeline(t)` is the pipeline's stored trajectory fidelity value (as computed internally vs that pipeline's exact evolution).

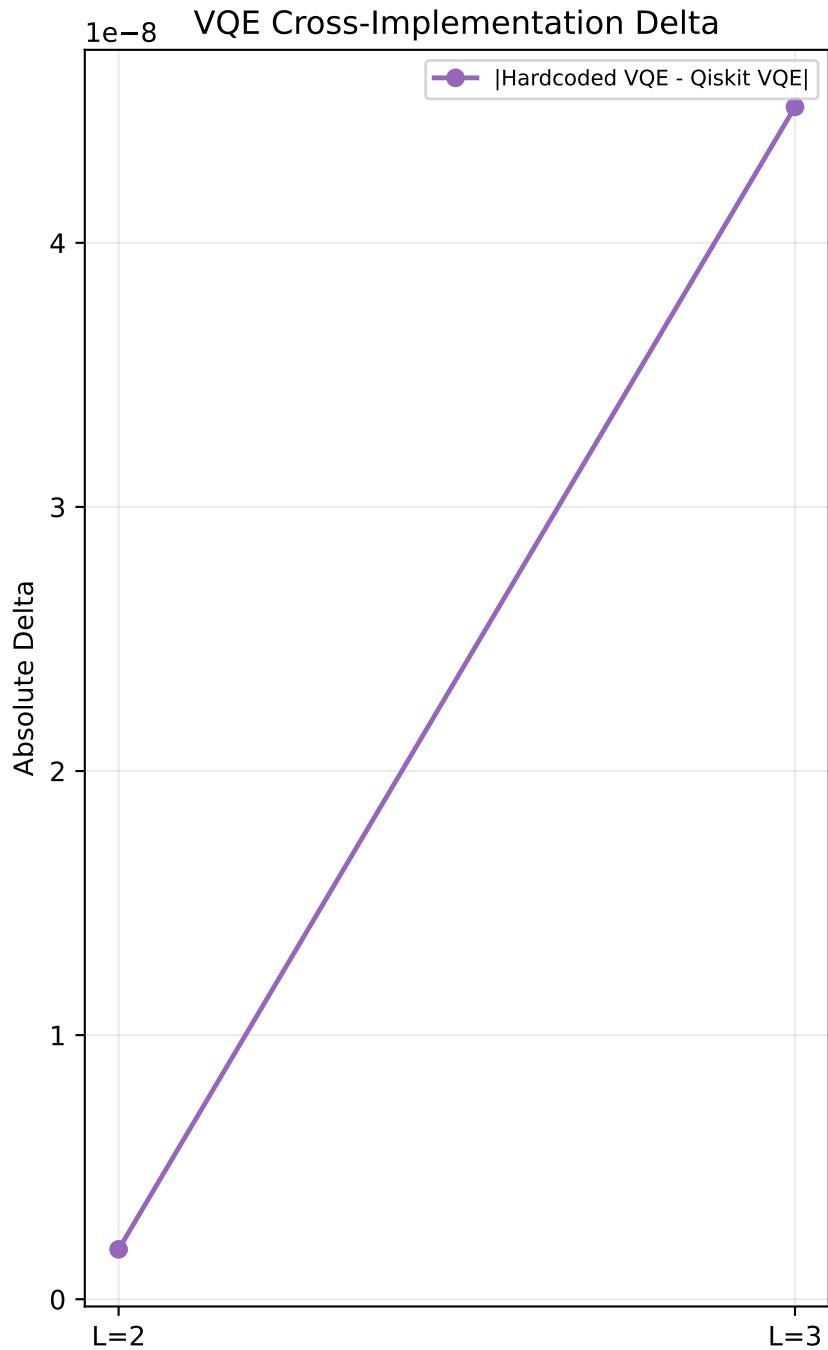
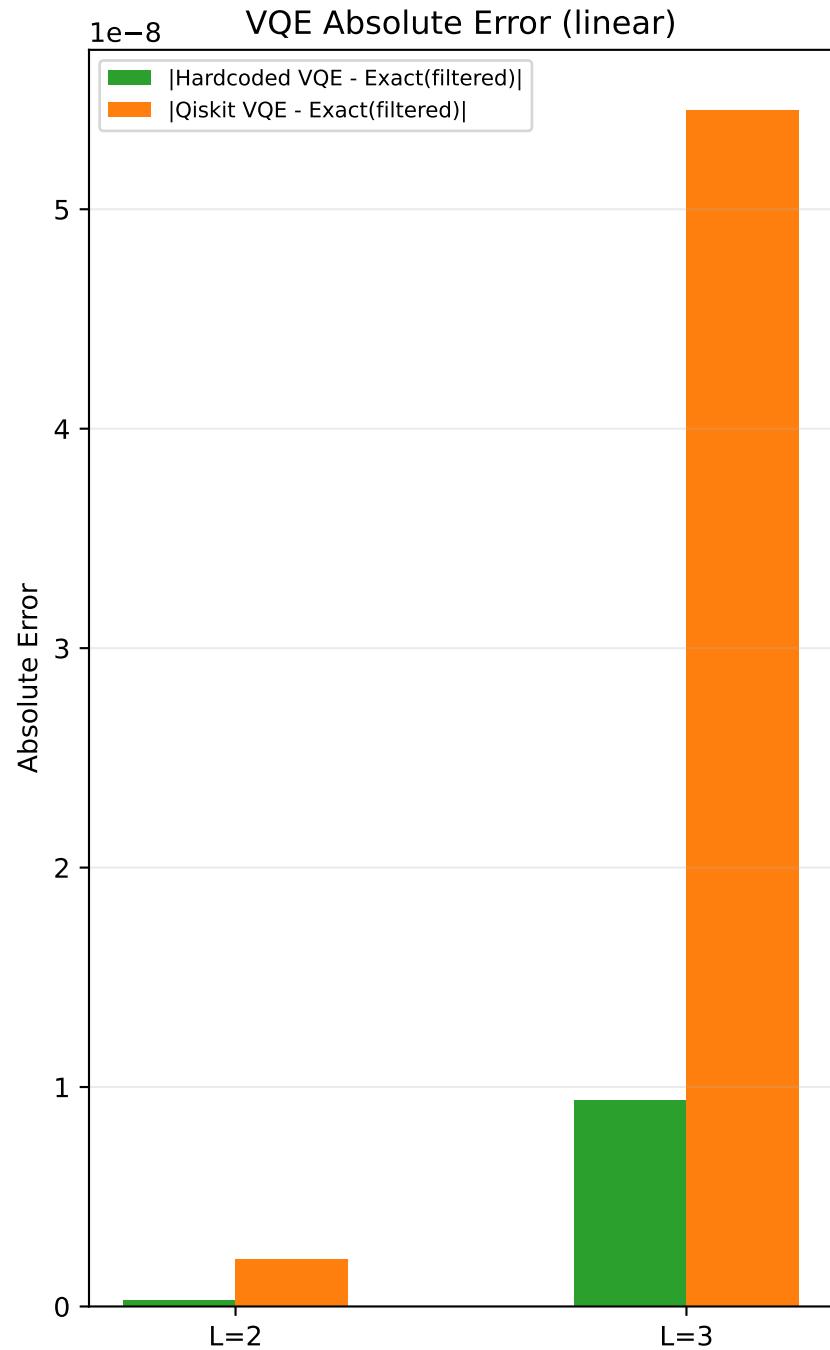
Per-L pass flags:

`L=2` `pass=True` `metrics_json=/Users/jakestrobel/Downloads/Testing-For-Trying-Again-main_copy-testforatestcuziknothing/artifacts/hardcoded_vs_qiskit_pipeline_L2_metrics.json`

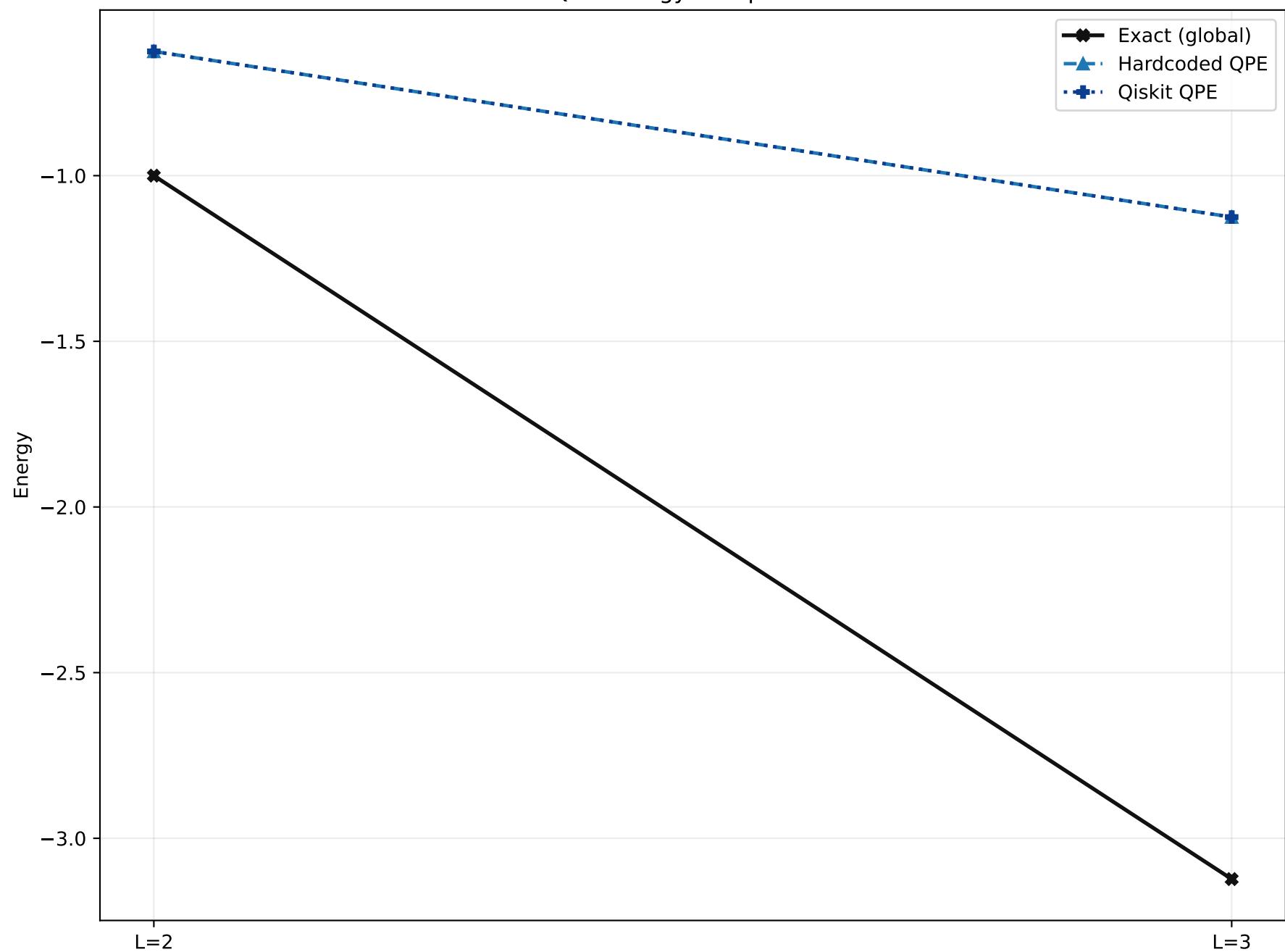
`L=3` `pass=False` `metrics_json=/Users/jakestrobel/Downloads/Testing-For-Trying-Again-main_copy-testforatestcuziknothing/artifacts/hardcoded_vs_qiskit_pipeline_L3_metrics.json`

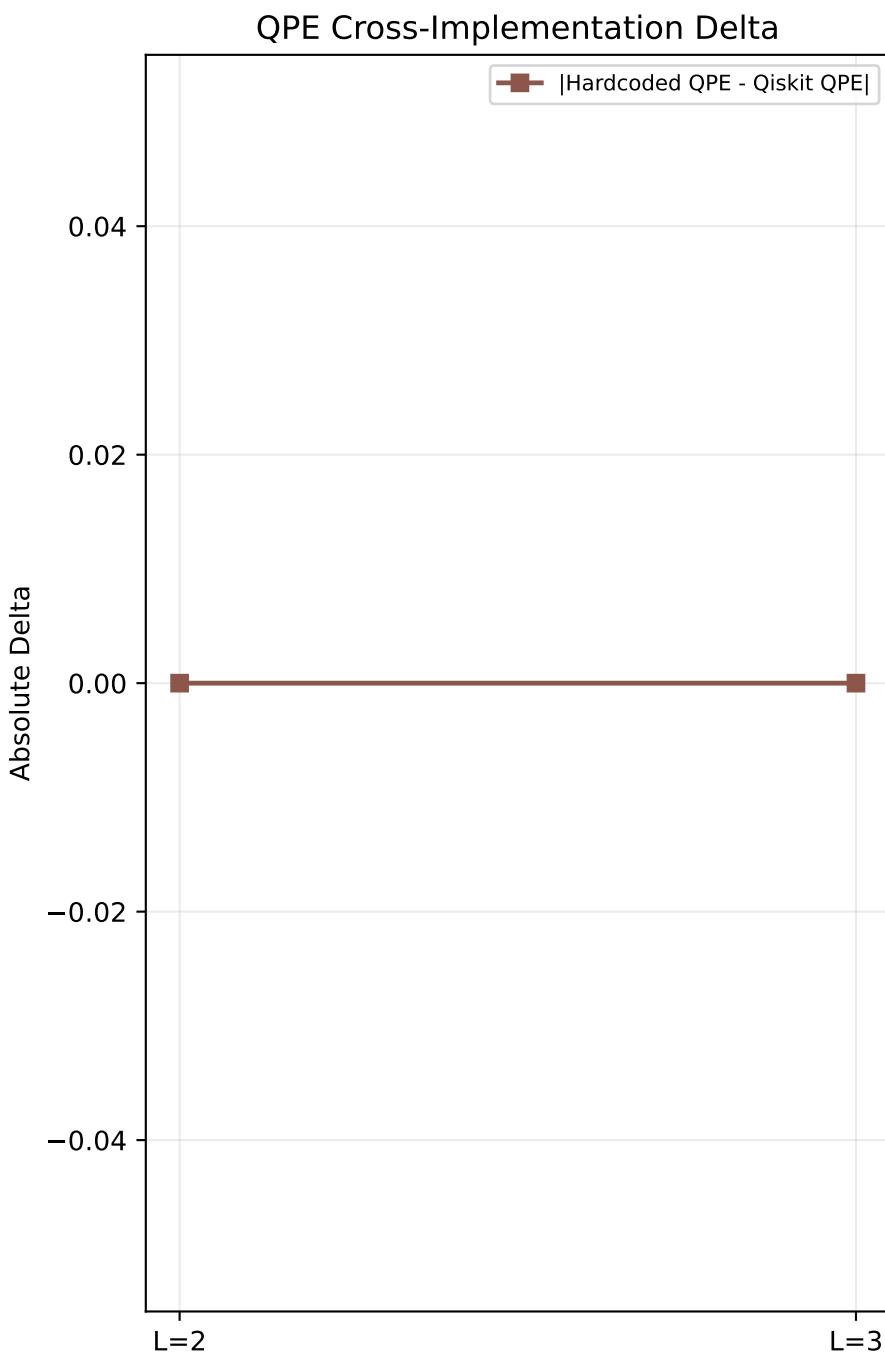
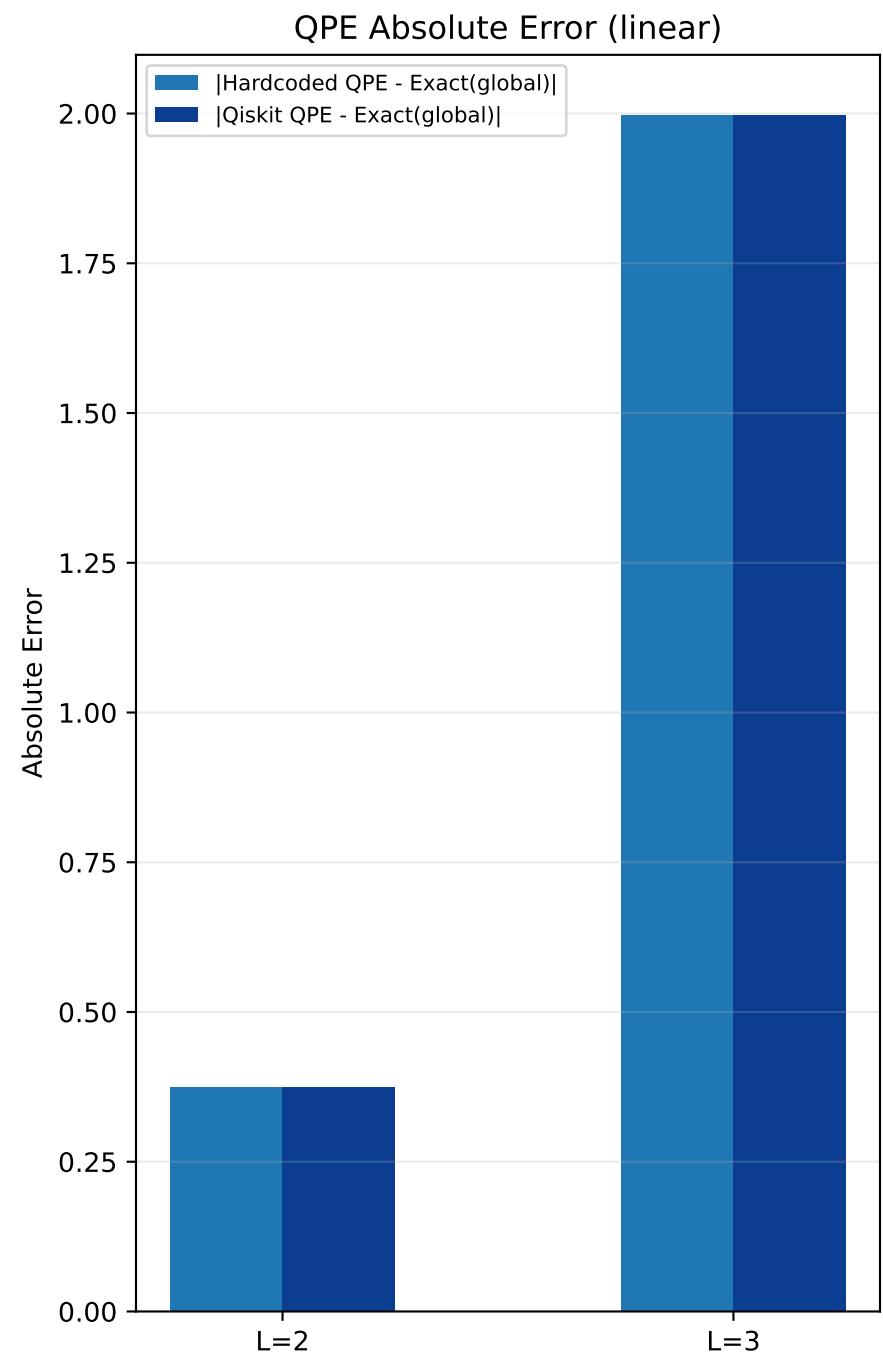
VQE Energy Comparison





QPE Energy Comparison





Bundle L=2: Run Settings & Metrics Summary

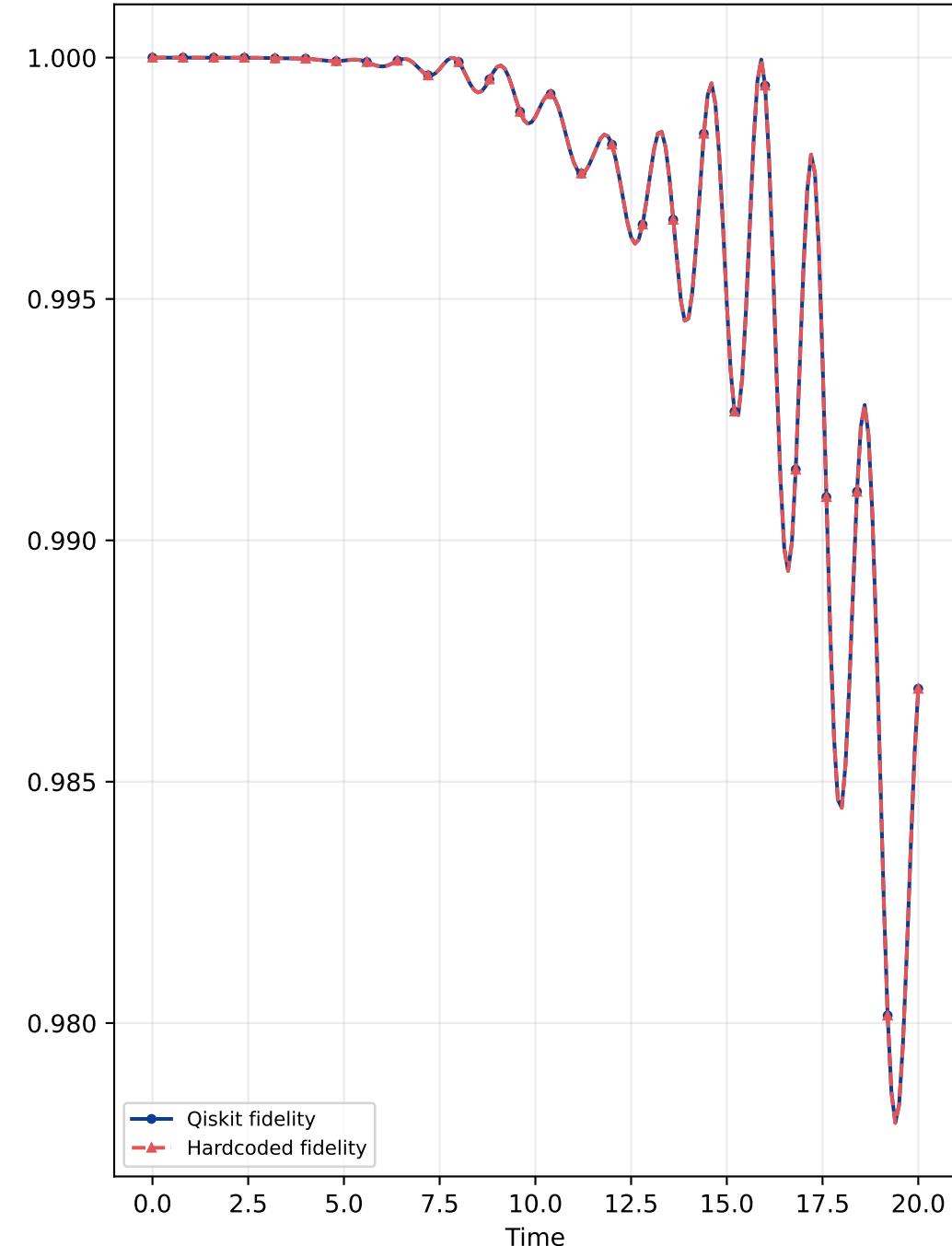
```
L=2  t=1.0  u=4.0  dv=0.0  boundary=periodic  ordering=blocked  initial_state_source=vqe  t_final=20.0  num_times=201  suz

thresholds:
doublon_trotter_max_abs_delta: 1.00e-03
energy_trotter_max_abs_delta: 1.00e-03
fidelity_max_abs_delta: 1.00e-04
ground_state_energy_abs_delta: 1.00e-08
n_dn_site0_trotter_max_abs_delta: 5.00e-03
n_up_site0_trotter_max_abs_delta: 5.00e-03

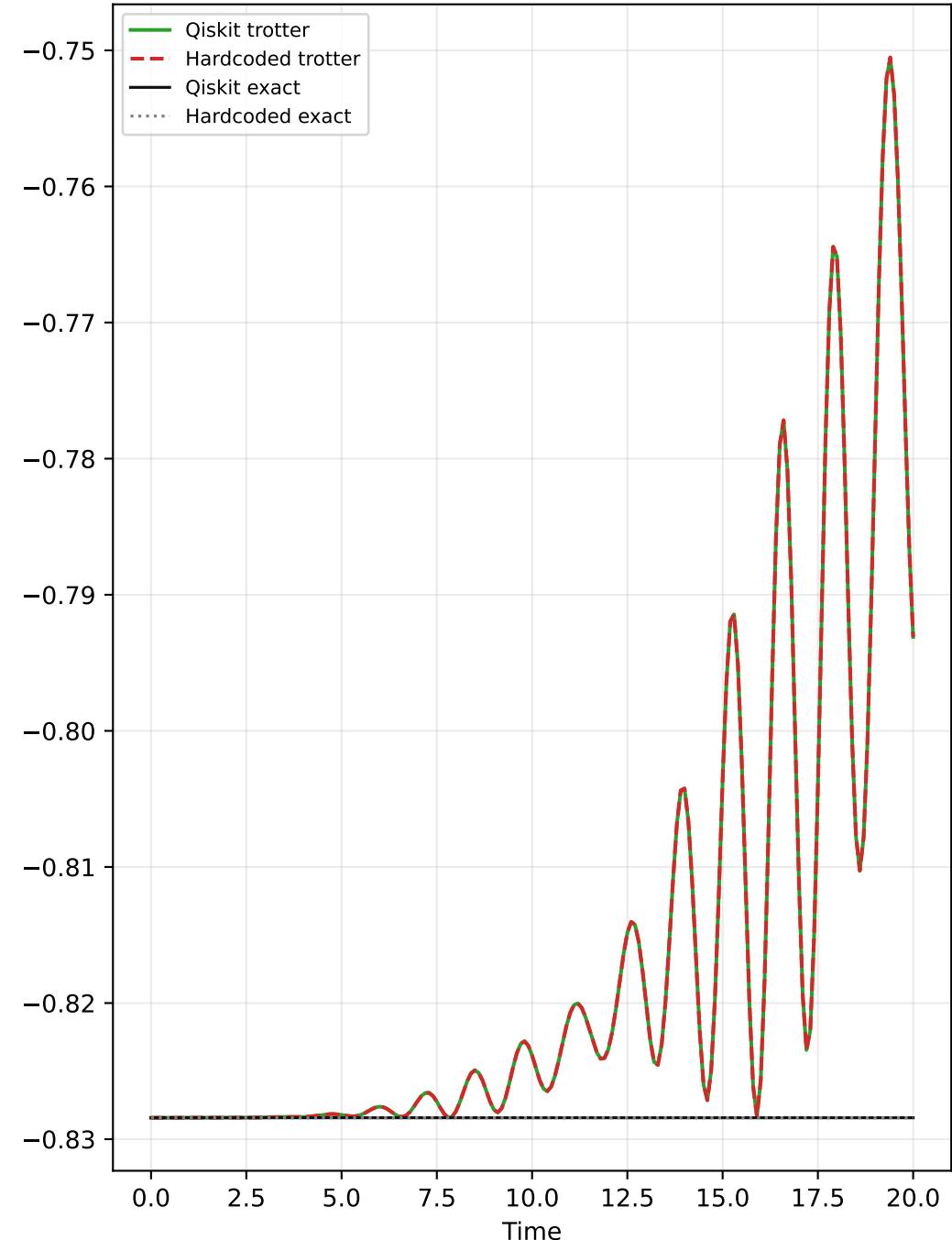
max |Δ|:
gs_energy: 0.00e+00
doublon_trotter: 2.79e-06
energy_trotter: 2.35e-05
fidelity: 8.59e-06
n_dn_site0_trotter: 2.79e-05
n_up_site0_trotter: 2.78e-05
result: PASS
```

Bundle Page: L=2 Fidelity & Energy

L=2 Fidelity

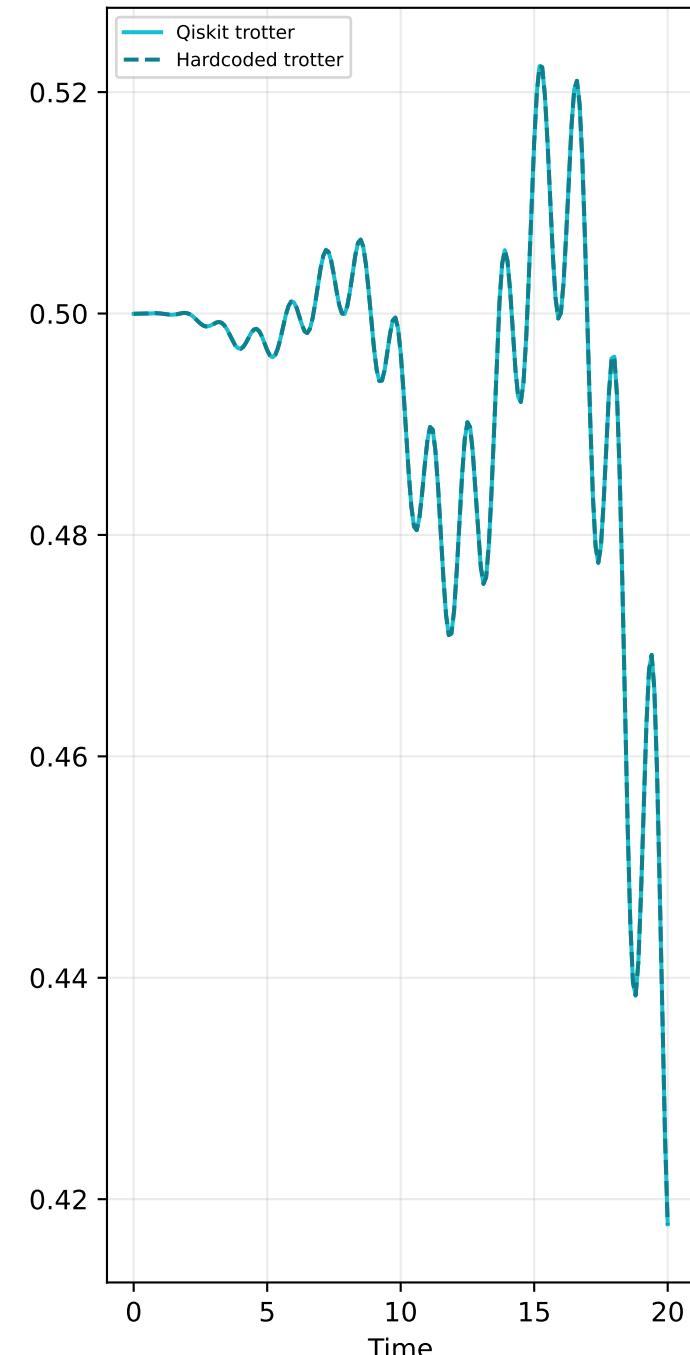


L=2 Energy

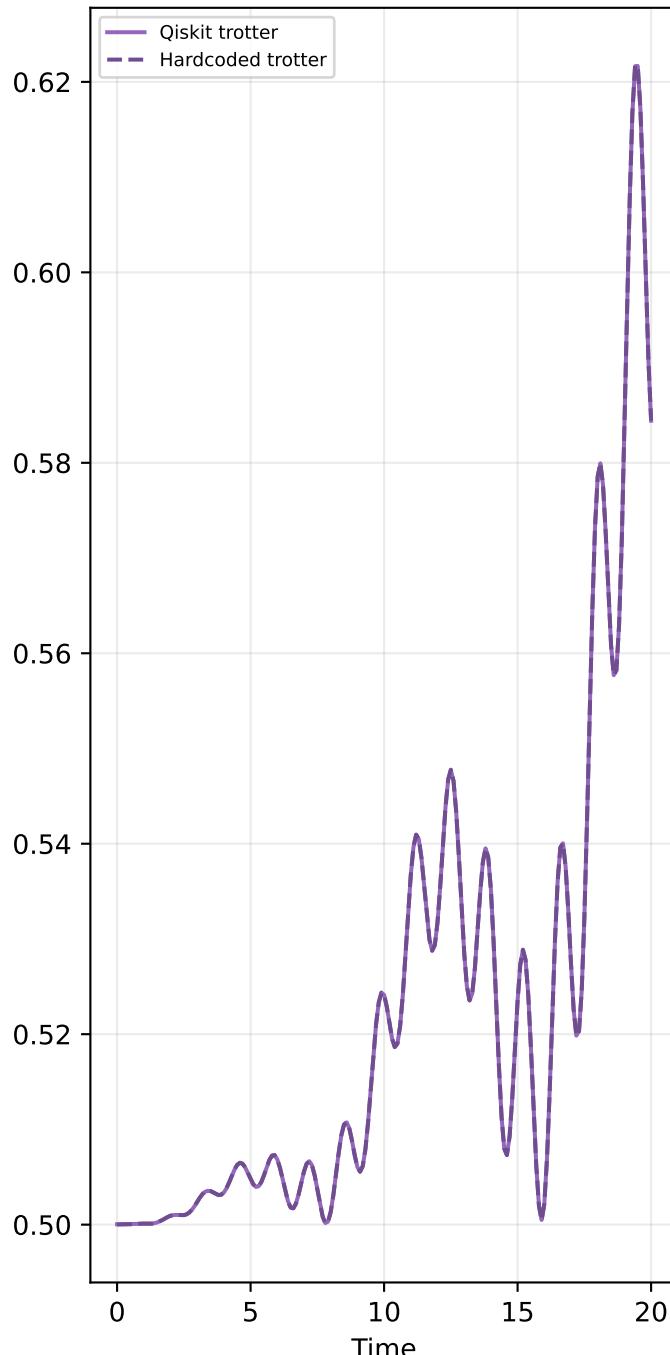


Bundle Page: L=2 Occupations & Doublon (auto-zoomed)

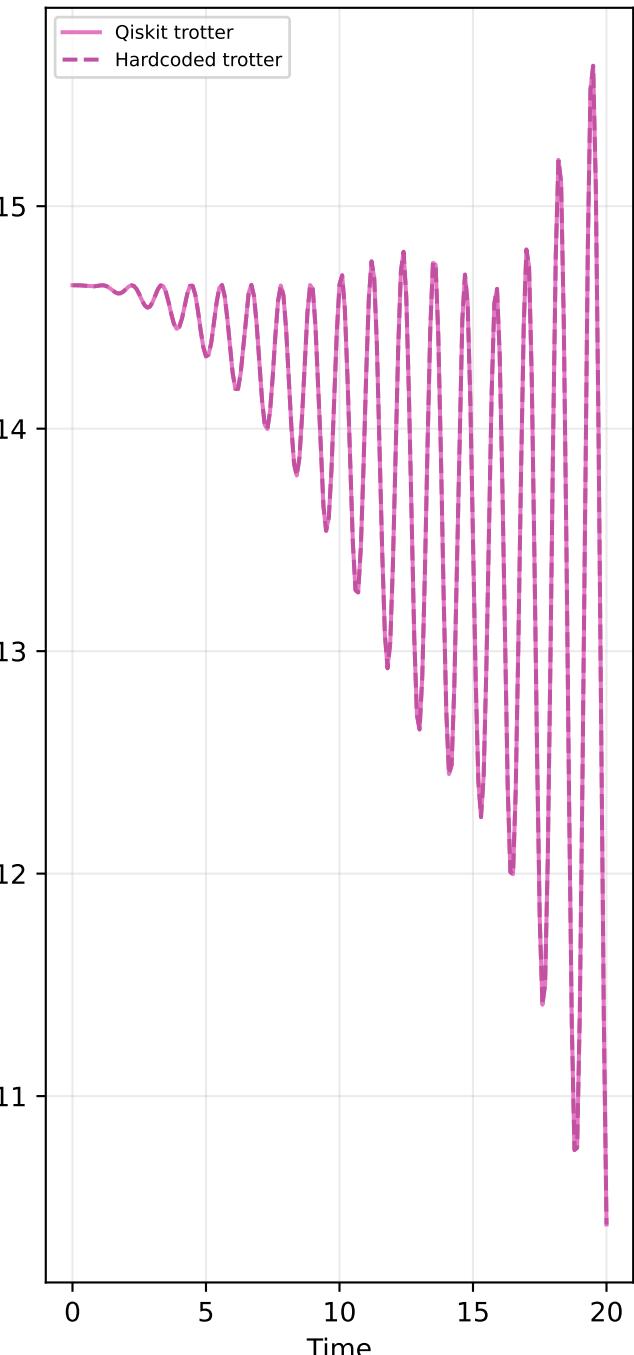
L=2 Site-0 n_up



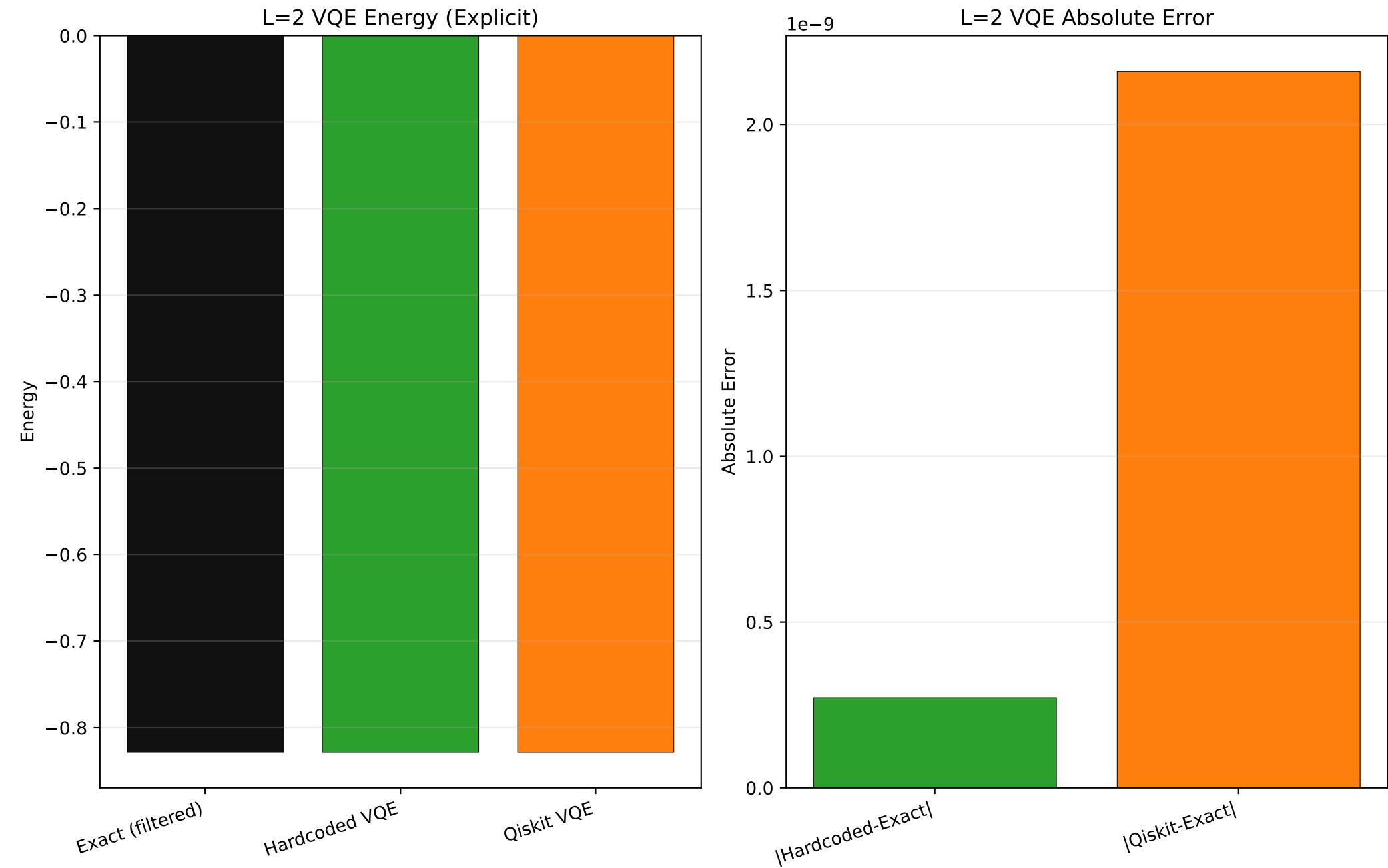
L=2 Site-0 n_dn



L=2 Doublon

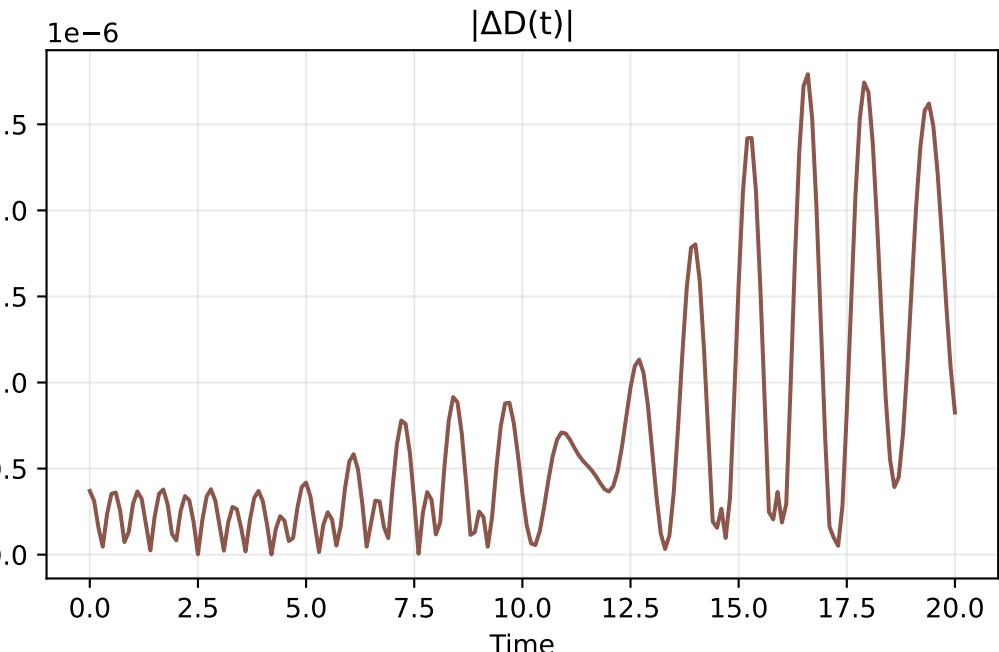
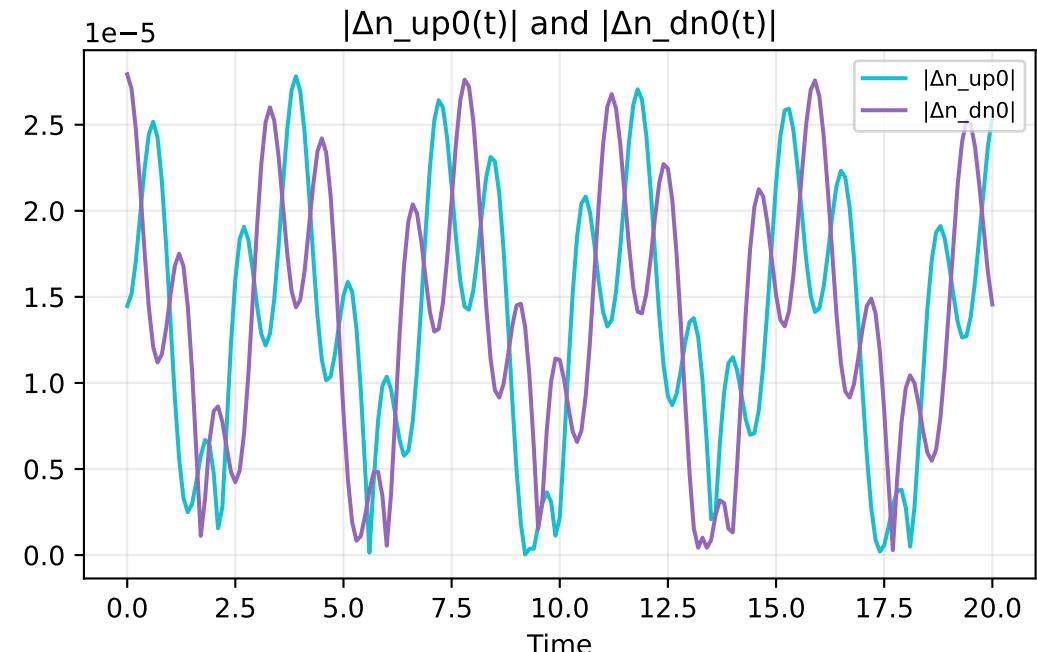
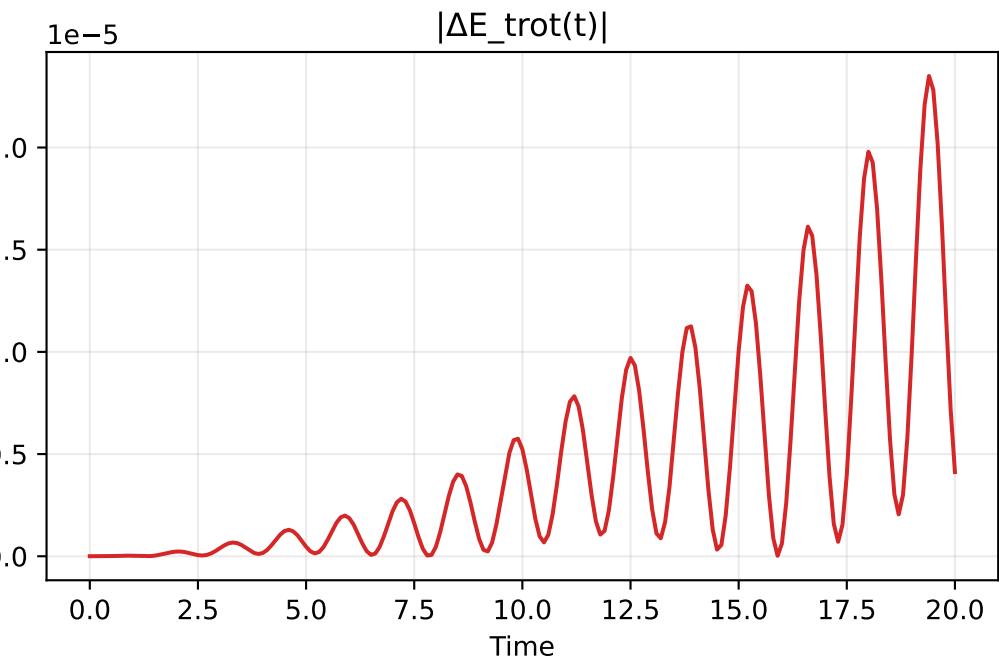
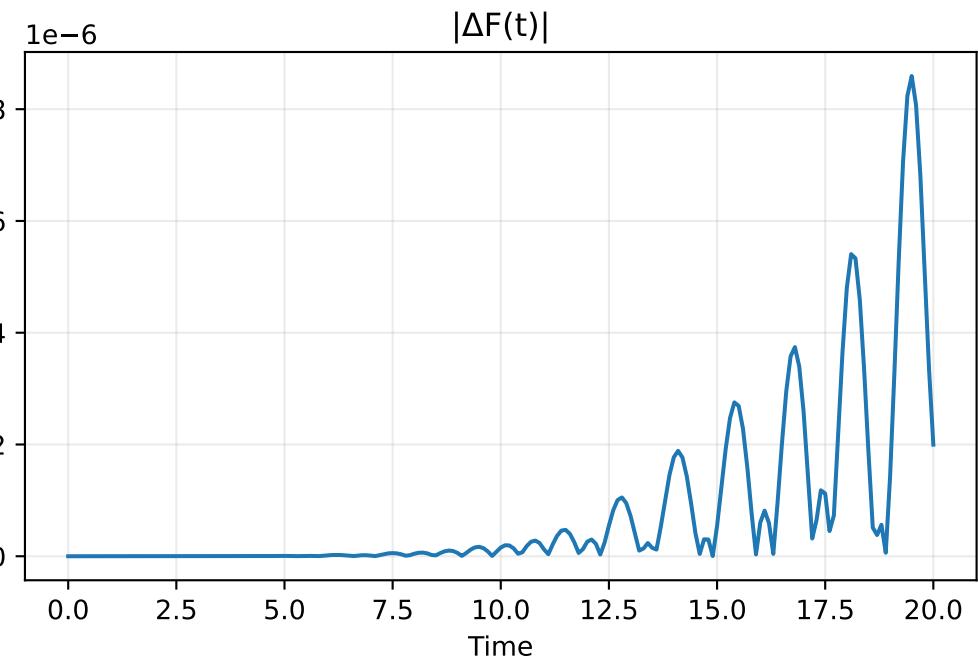


When initial_state_source=vqe, Trotter $E(t=0) = \langle \psi_{\text{vqe}} | H | \psi_{\text{vqe}} \rangle$ = VQE energy.
VQE energy \neq exact ground state energy unless VQE fully converged.



Bundle Delta Diagnostics L=2

$\Delta X(t) = |X_{hc}(t) - X_{qk}(t)|$, where $X_{pipeline}(t)$ is that pipeline's stored trajectory value.



Bundle metrics page L=2

Trotterization comparison uses each path's configured initial state.

For VQE-init runs, both exact(t) and trotter(t) start from the VQE ansatz state.

Delta metric definitions:

$\Delta F(t) = |F_{hc}(t) - F_{qk}(t)|$
 $\Delta E_{trot}(t) = |E_{trot_hc}(t) - E_{trot_qk}(t)|$
 $\Delta n_{up0}(t) = |n_{up0_hc}(t) - n_{up0_qk}(t)|$
 $\Delta n_{dn0}(t) = |n_{dn0_hc}(t) - n_{dn0_qk}(t)|$
 $\Delta D(t) = |D_{hc}(t) - D_{qk}(t)|$

$F_{pipeline}(t)$ is the pipeline's stored trajectory fidelity value (as computed internally vs that pipeline's exact evolution).

```
ground_state_energy_abs_delta = 0.0
fidelity max/mean/final = 8.59377818263063e-06 / 8.005364268005184e-07 / 1.9968946775028584e-06
energy_trotter max/mean/final = 2.3499154368722408e-05 / 4.296069546226253e-06 / 4.121644446297701e-06
n_up_site0_trotter max/mean/final = 2.781282510533334e-05 / 1.3631273238300274e-05 / 2.545305309981094e-05
n_dn_site0_trotter max/mean/final = 2.7934482115687942e-05 / 1.3868963351504503e-05 / 1.4557018242267183e-05
doublon_trotter max/mean/final = 2.7910871213676636e-06 / 6.794619643993374e-07 / 8.256188262223407e-07
```

checks:

```
{'doublon_trotter_max_abs_delta': True,
 'energy_trotter_max_abs_delta': True,
 'fidelity_max_abs_delta': True,
 'ground_state_energy_abs_delta': True,
 'n_dn_site0_trotter_max_abs_delta': True,
 'n_up_site0_trotter_max_abs_delta': True}
```

PASS = True

Bundle L=3: Run Settings & Metrics Summary

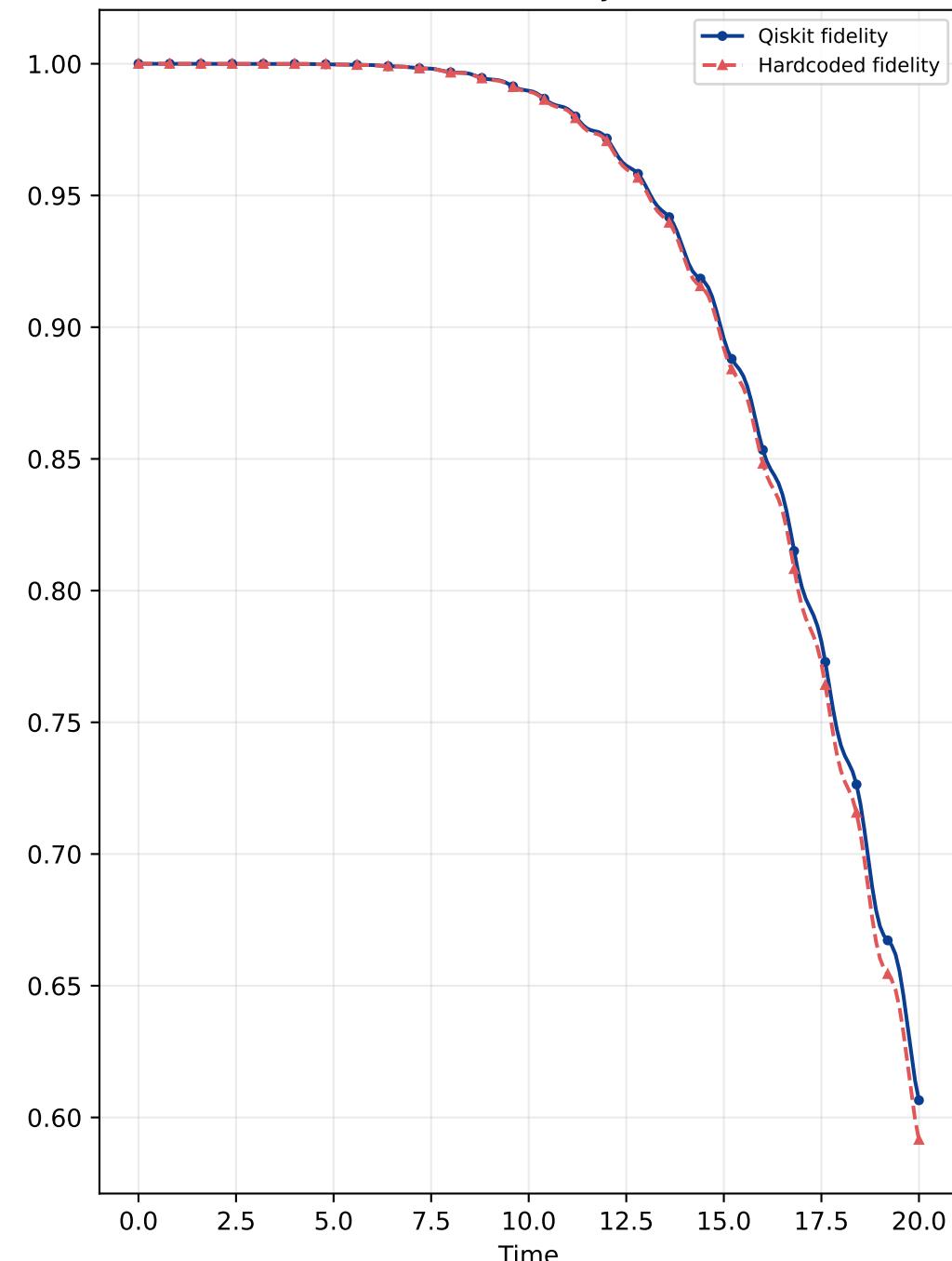
```
L=3  t=1.0  u=4.0  dv=0.0  boundary=periodic  ordering=blocked  initial_state_source=vqe  t_final=20.0  num_times=201  suz

thresholds:
doublon_trotter_max_abs_delta: 1.00e-03
energy_trotter_max_abs_delta: 1.00e-03
fidelity_max_abs_delta: 1.00e-04
ground_state_energy_abs_delta: 1.00e-08
n_dn_site0_trotter_max_abs_delta: 5.00e-03
n_up_site0_trotter_max_abs_delta: 5.00e-03

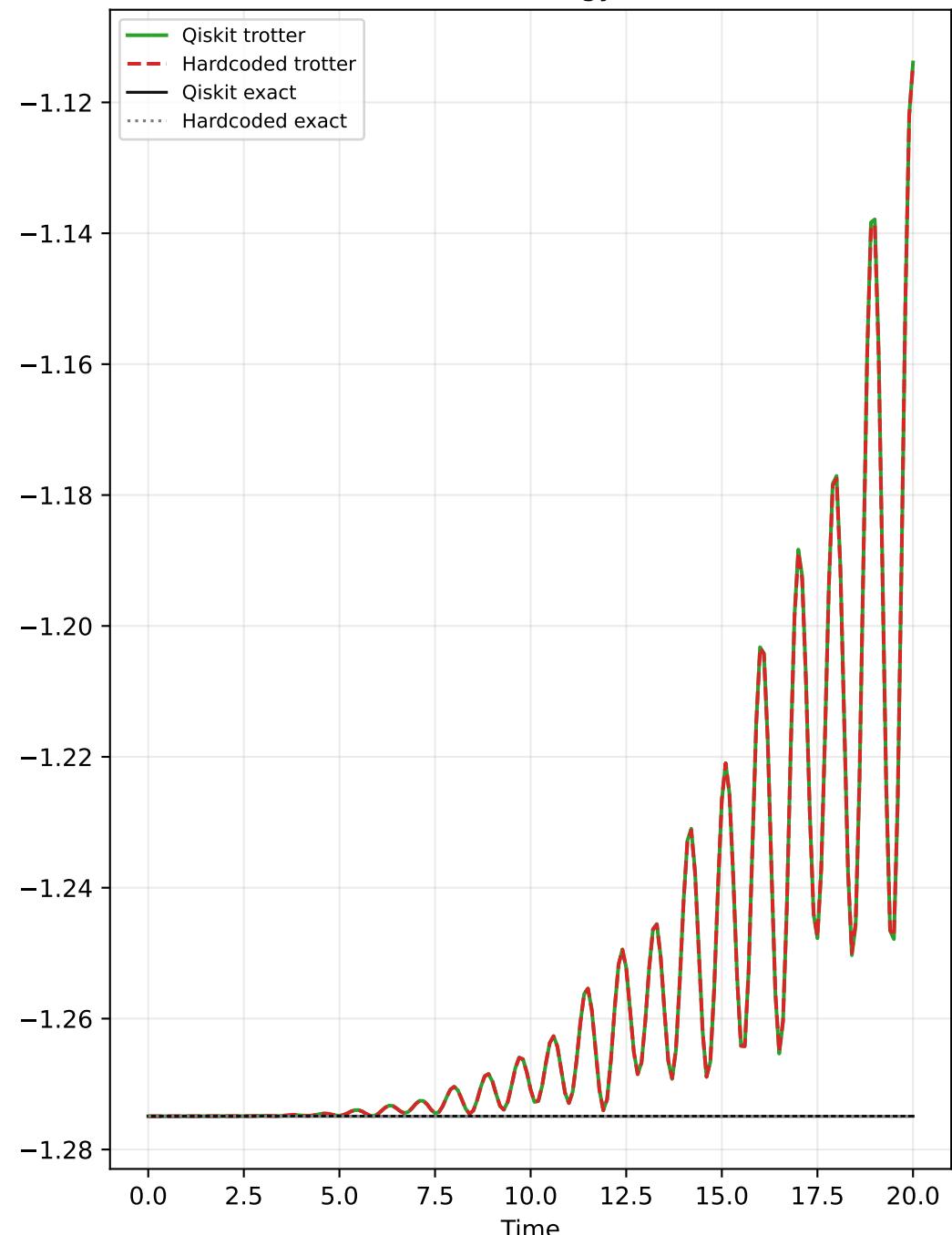
max |Δ|:
gs_energy: 0.00e+00
doublon_trotter: 3.87e-04
energy_trotter: 9.26e-04
fidelity: 1.50e-02
n_dn_site0_trotter: 4.43e-03
n_up_site0_trotter: 5.05e-03
result: FAIL
```

Bundle Page: L=3 Fidelity & Energy

L=3 Fidelity

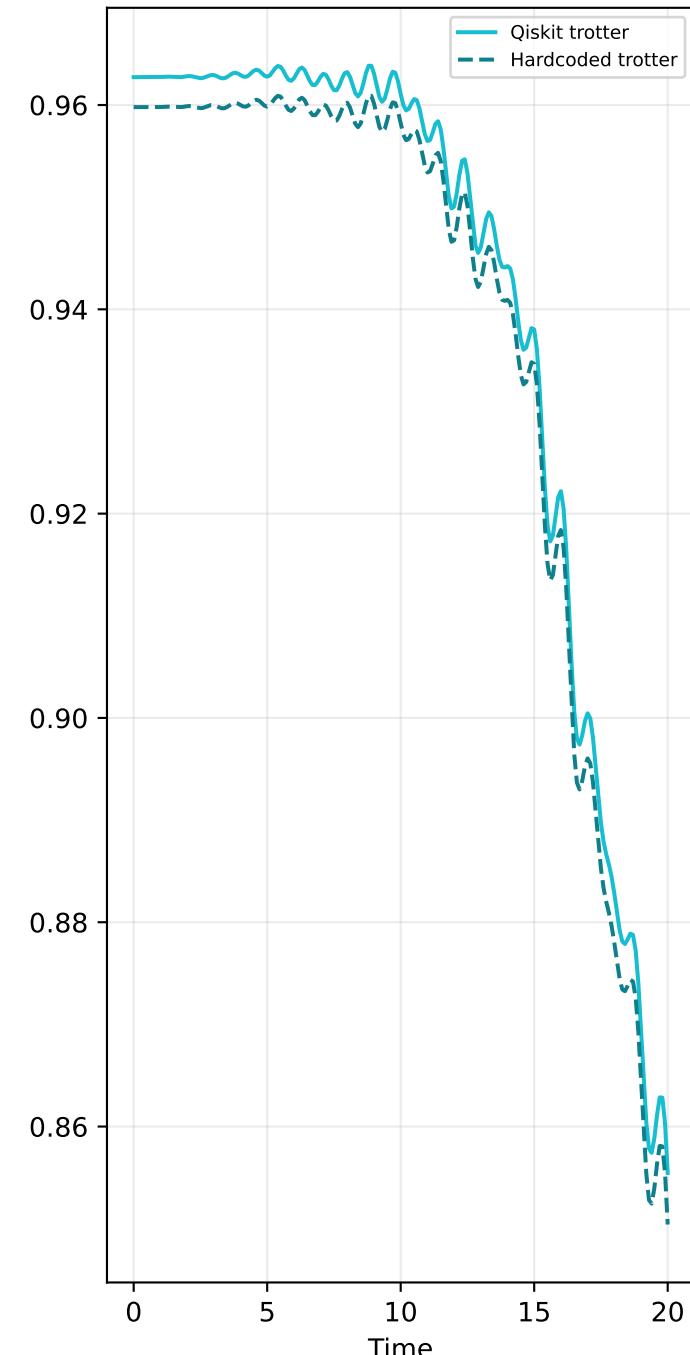


L=3 Energy

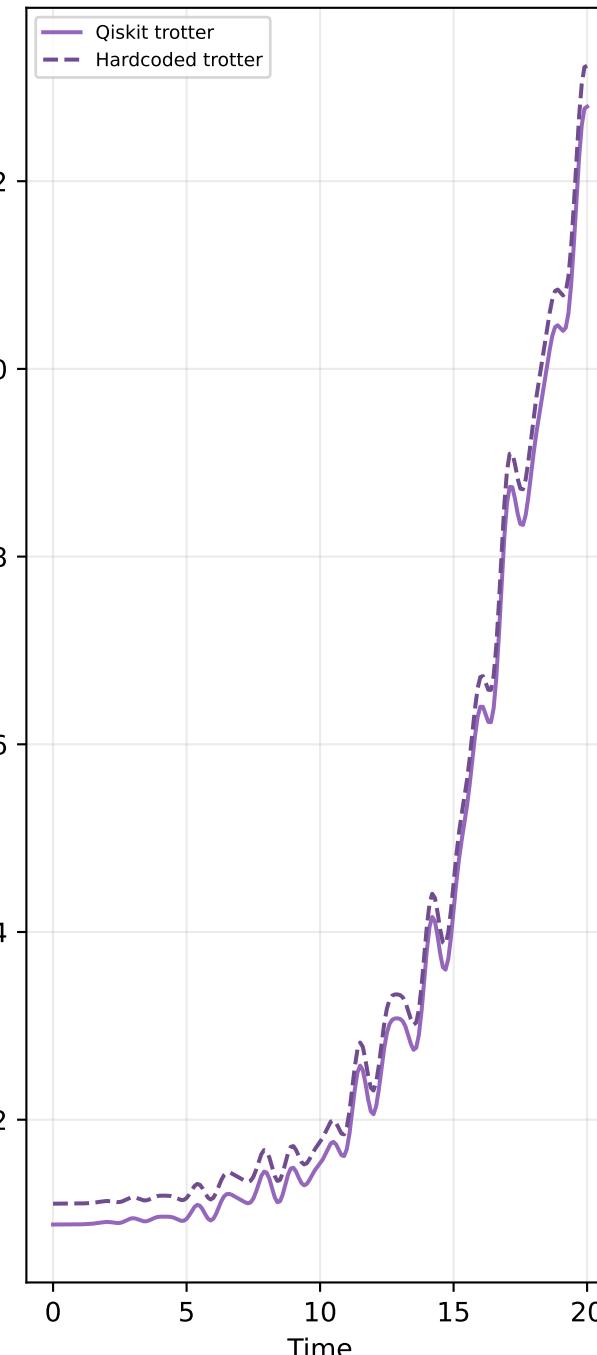


Bundle Page: L=3 Occupations & Doublon (auto-zoomed)

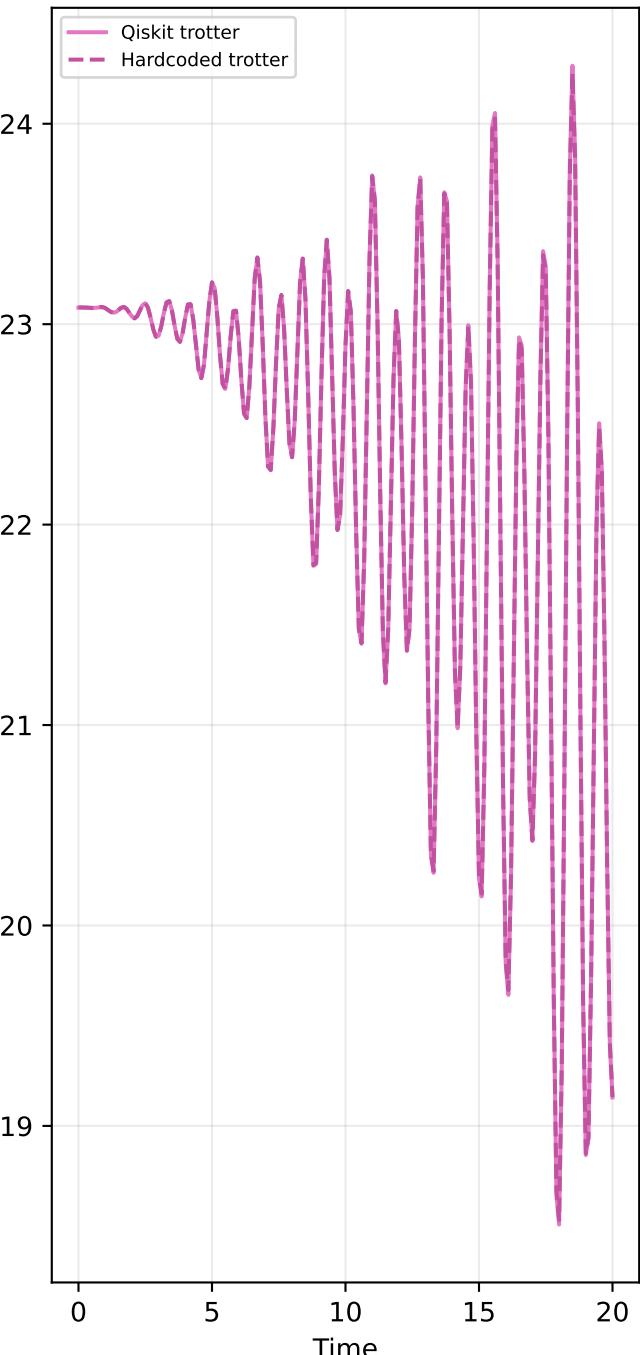
L=3 Site-0 n_up



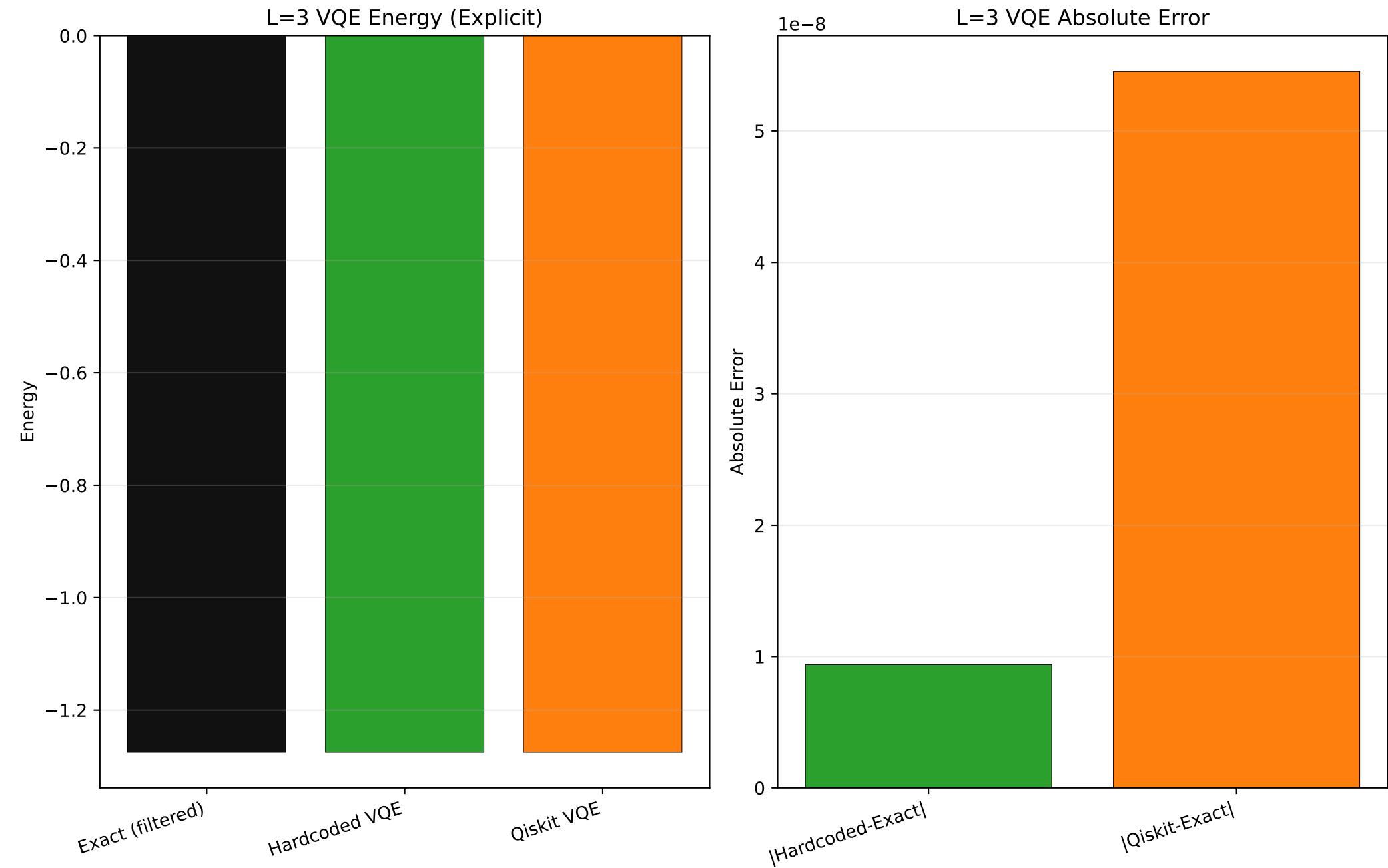
L=3 Site-0 n_dn



L=3 Doublon



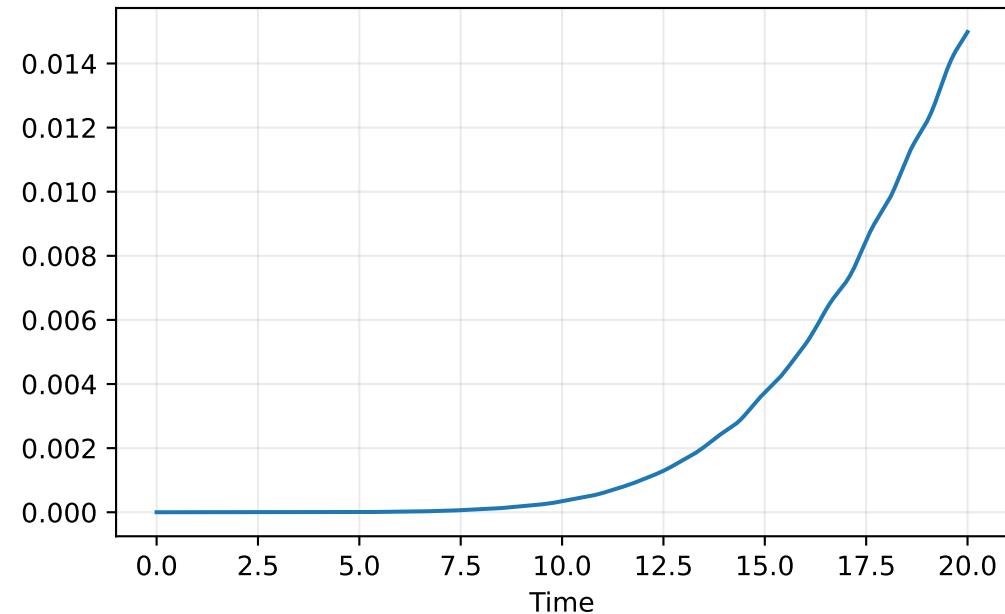
When `initial_state_source=vqe`, Trotter $E(t=0) = \langle \psi_{\text{vqe}} | H | \psi_{\text{vqe}} \rangle = \text{VQE energy}$.
VQE energy \neq exact ground state energy unless VQE fully converged.



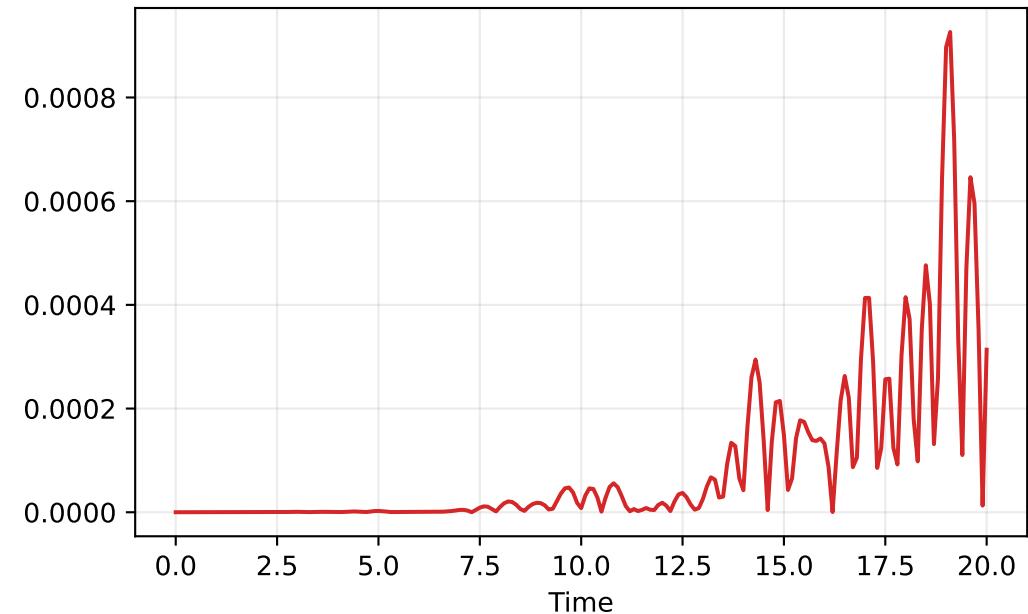
Bundle Delta Diagnostics L=3

$\Delta X(t) = |X_{hc}(t) - X_{qk}(t)|$, where $X_{pipeline}(t)$ is that pipeline's stored trajectory value.

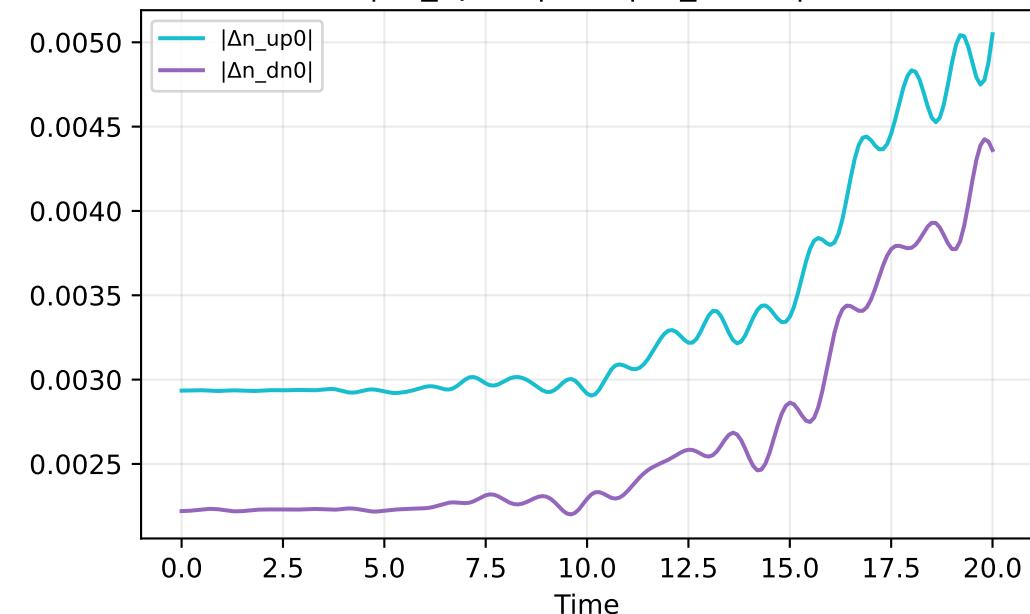
$|\Delta F(t)|$



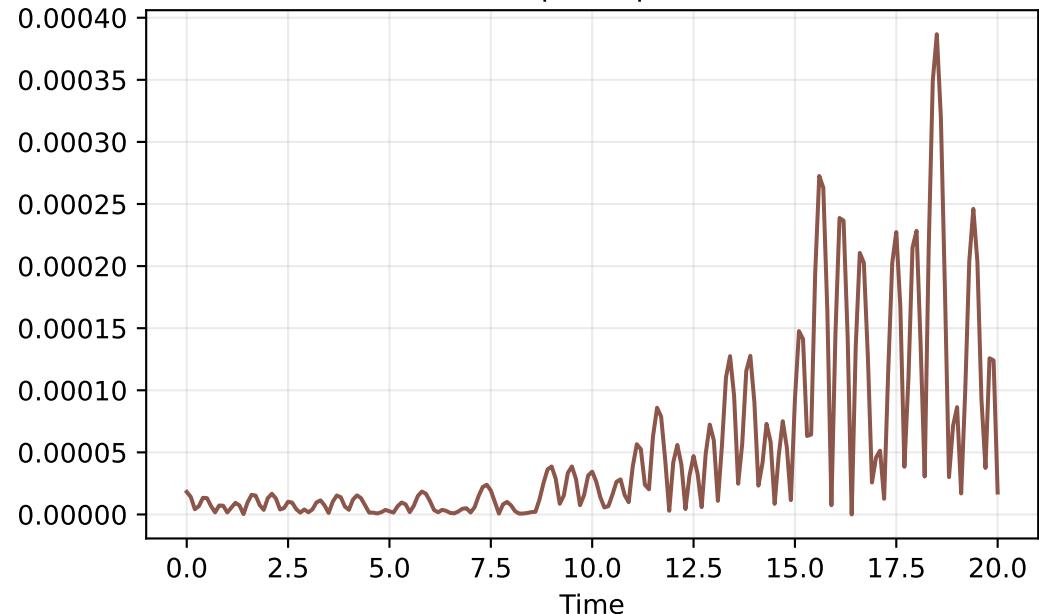
$|\Delta E_{trot}(t)|$



$|\Delta n_{up0}(t)|$ and $|\Delta n_{dn0}(t)|$



$|\Delta D(t)|$



Bundle metrics page L=3

Trotterization comparison uses each path's configured initial state.

For VQE-init runs, both exact(t) and trotter(t) start from the VQE ansatz state.

Delta metric definitions:

$\Delta F(t) = |F_{hc}(t) - F_{qk}(t)|$
 $\Delta E_{trot}(t) = |E_{trot_hc}(t) - E_{trot_qk}(t)|$
 $\Delta n_{up0}(t) = |n_{up0_hc}(t) - n_{up0_qk}(t)|$
 $\Delta n_{dn0}(t) = |n_{dn0_hc}(t) - n_{dn0_qk}(t)|$
 $\Delta D(t) = |D_{hc}(t) - D_{qk}(t)|$

$F_{pipeline}(t)$ is the pipeline's stored trajectory fidelity value (as computed internally vs that pipeline's exact evolution).

```
ground_state_energy_abs_delta = 0.0
fidelity max/mean/final = 0.01498211624223178 / 0.0026228128944948675 / 0.01498211624223178
energy_trotter max/mean/final = 0.0009262789164428131 / 8.661592784828267e-05 / 0.0003135182330653574
n_up_site0_trotter max/mean/final = 0.005047973459523791 / 0.003382685110198956 / 0.005047973459523791
n_dn_site0_trotter max/mean/final = 0.00442528828696051 / 0.002651645056505349 / 0.004361160282703724
doublon_trotter max/mean/final = 0.000386736648408631 / 5.238518717496887e-05 / 1.7647133442239005e-05
```

checks:

```
{'doublon_trotter_max_abs_delta': True,
 'energy_trotter_max_abs_delta': True,
 'fidelity_max_abs_delta': False,
 'ground_state_energy_abs_delta': True,
 'n_dn_site0_trotter_max_abs_delta': True,
 'n_up_site0_trotter_max_abs_delta': False}
```

PASS = False