

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:

```
 $\Delta F(t) = |F_{hc}(t) - F_{qk}(t)|$   
 $\Delta E_{trot}(t) = |E_{trot\_hc}(t) - E_{trot\_qk}(t)|$   
 $\Delta n_{up0}(t) = |n_{up0\_hc}(t) - n_{up0\_qk}(t)|$   
 $\Delta n_{dn0}(t) = |n_{dn0\_hc}(t) - n_{dn0\_qk}(t)|$   
 $\Delta D(t) = |D_{hc}(t) - D_{qk}(t)|$ 
```

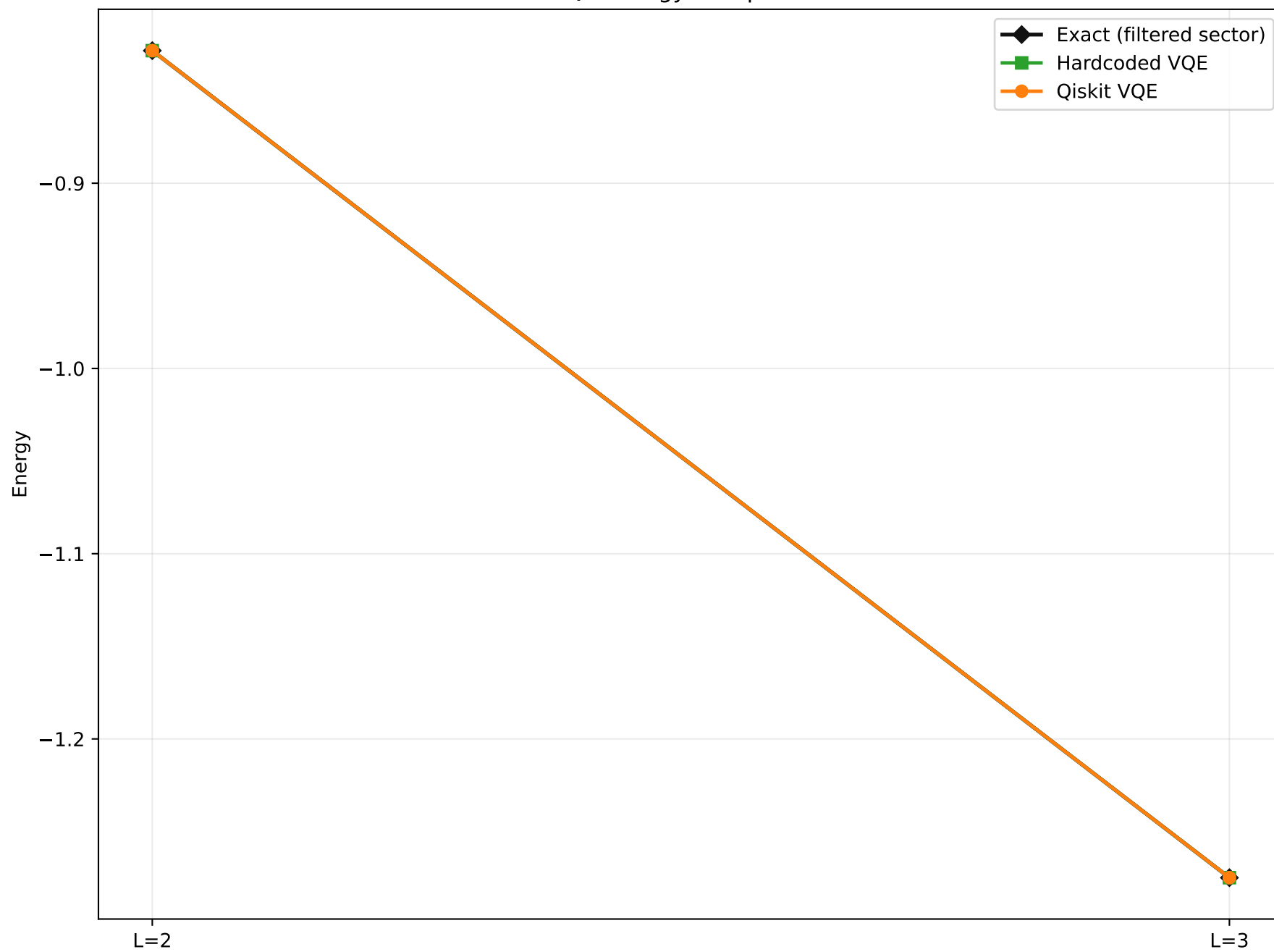
$F_{\text{pipeline}}(t)$ is the pipeline's stored trajectory fidelity value (as computed internally vs that pipeline's exact evolution).

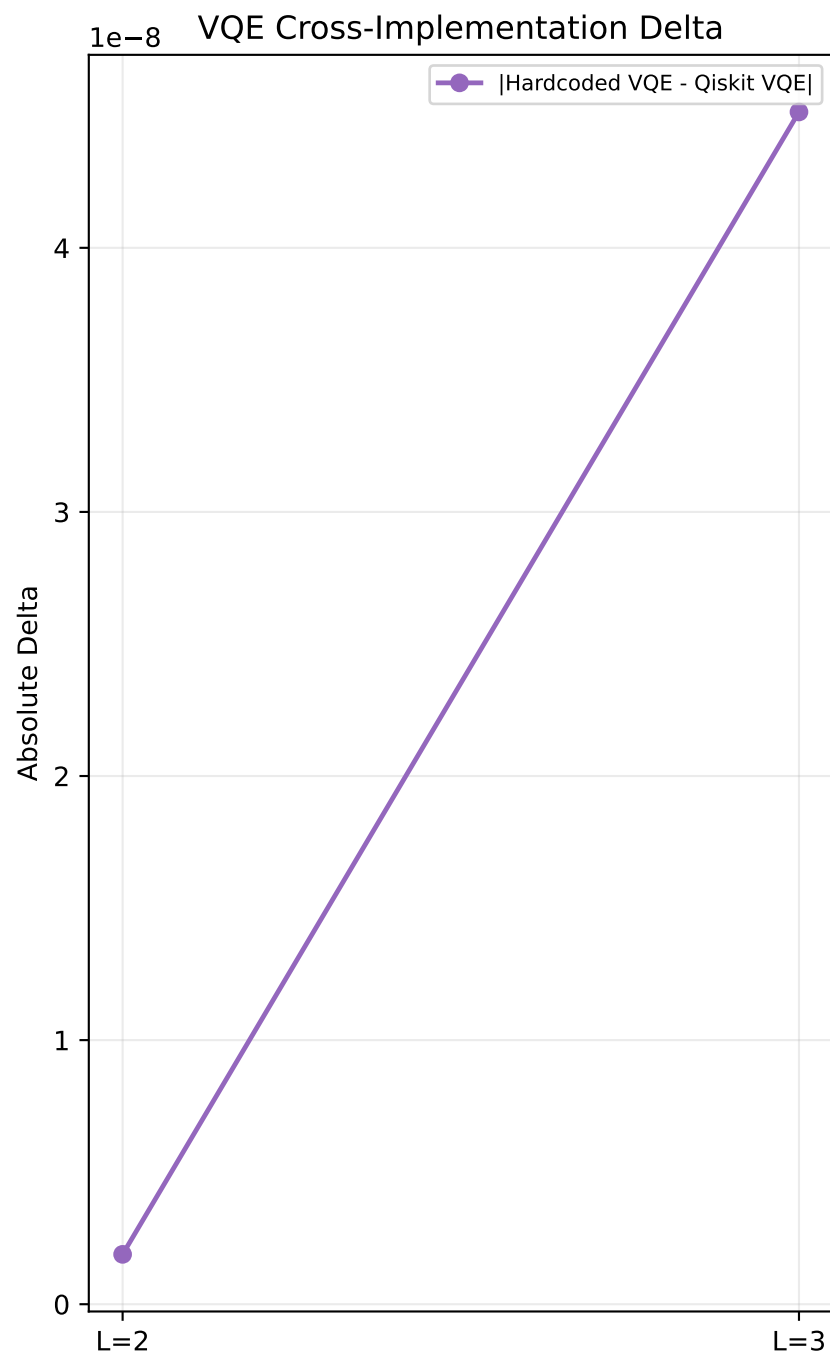
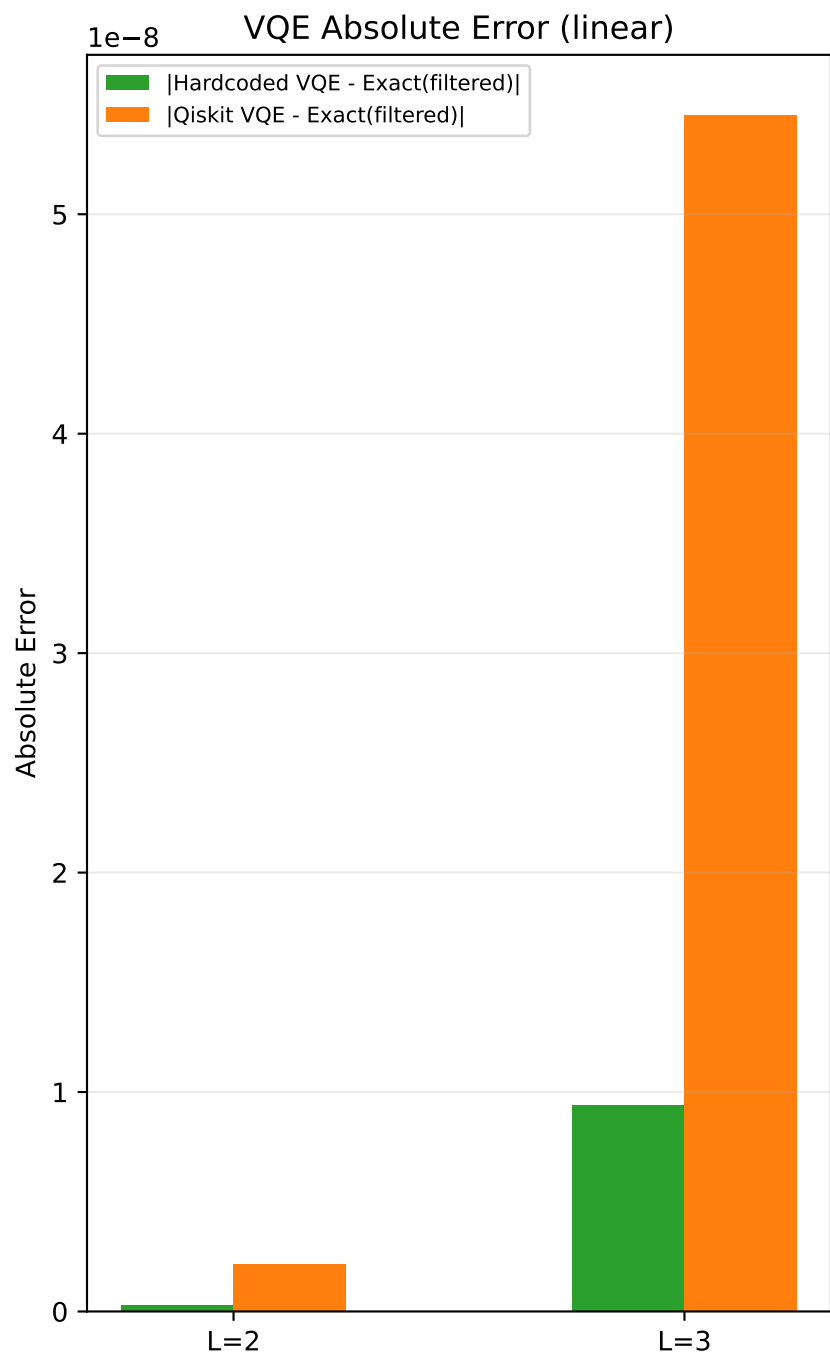
Per-L pass flags:

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

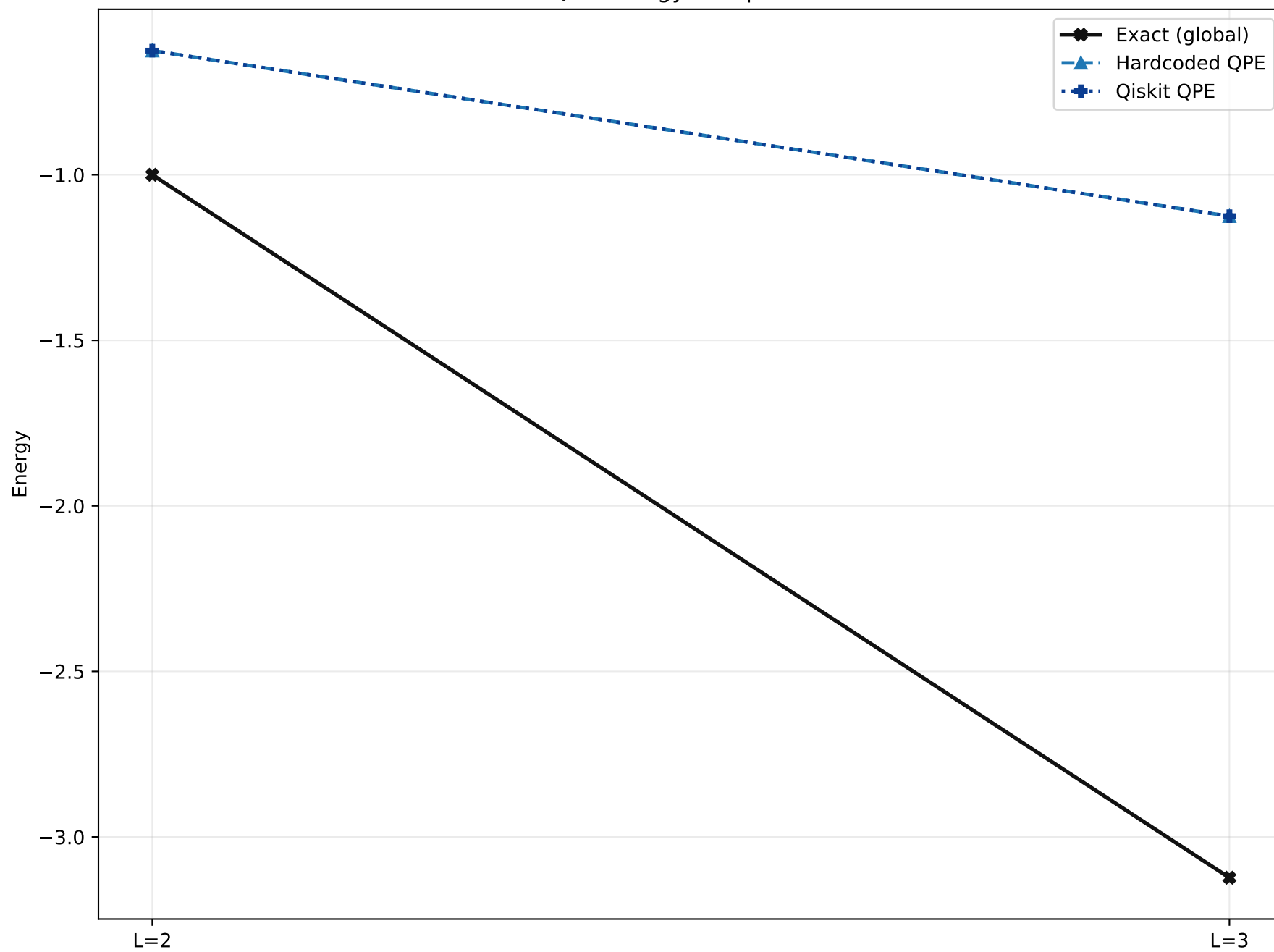
L=3 pass=False metrics_json=/Users/jakestrobels/Downloads/Testing-For-Trying-Again-main_copy-testforatestcuziknothing/artifacts/hardcoded_vs_qiskit_pipeline_L3_metrics.json

VQE Energy Comparison

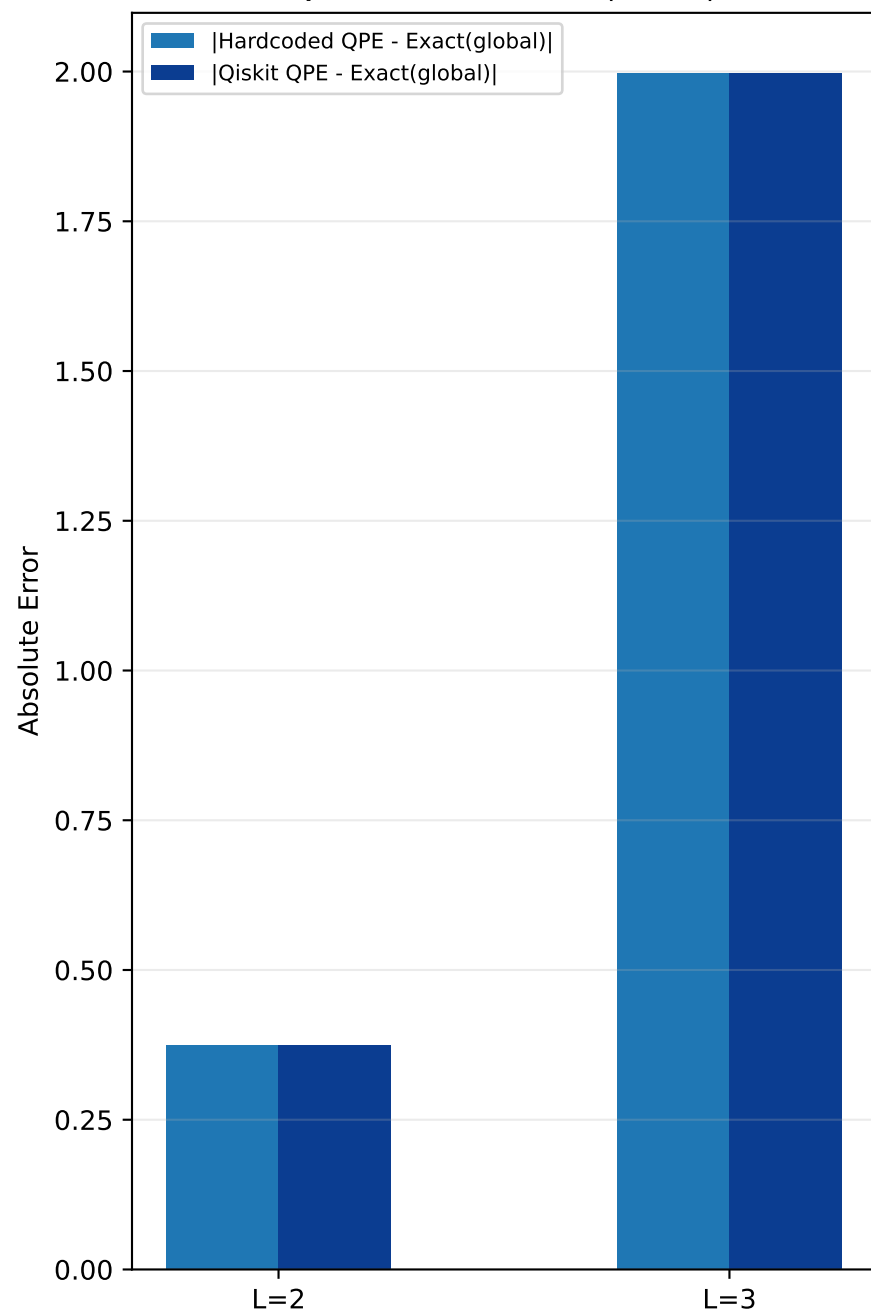




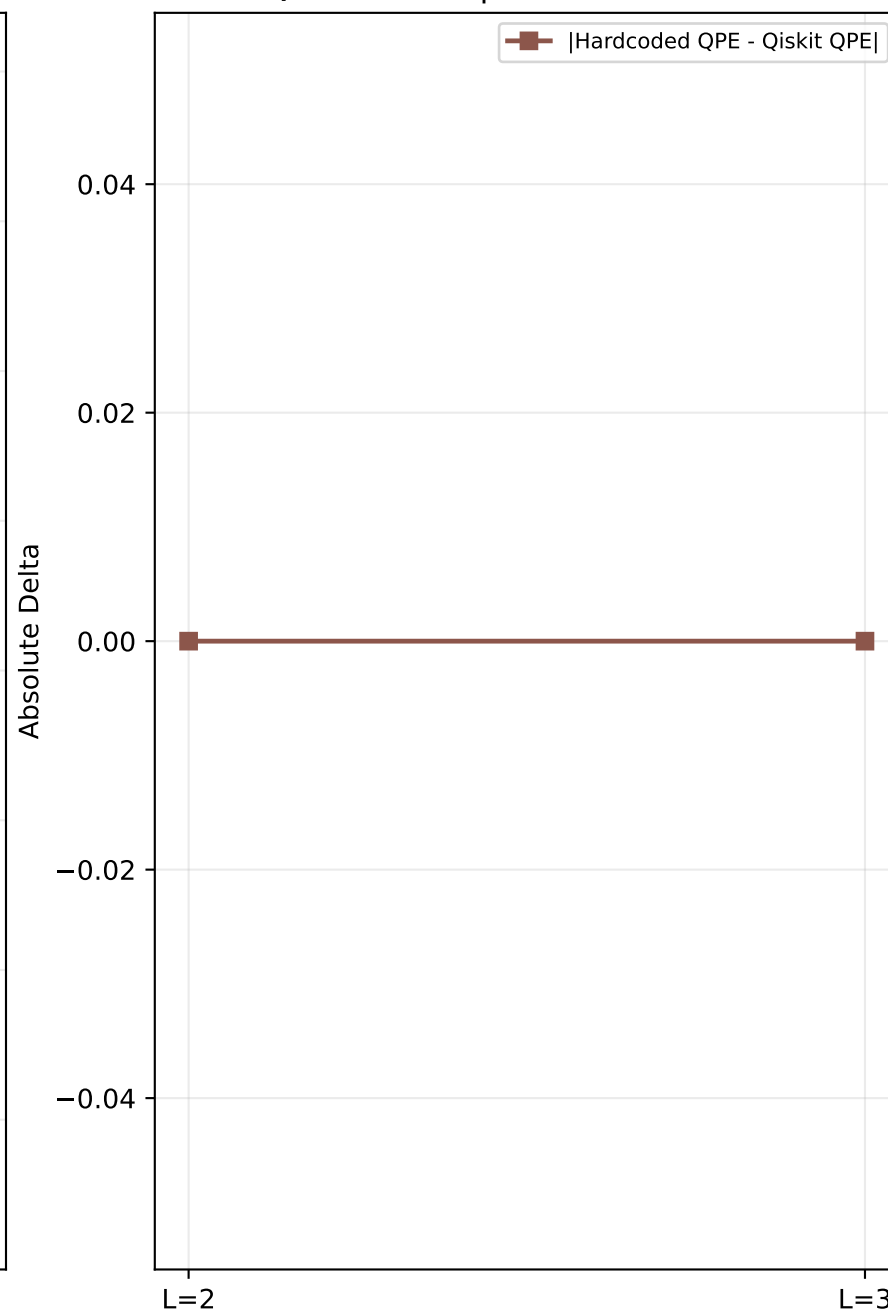
QPE Energy Comparison



QPE Absolute Error (linear)



QPE Cross-Implementation Delta

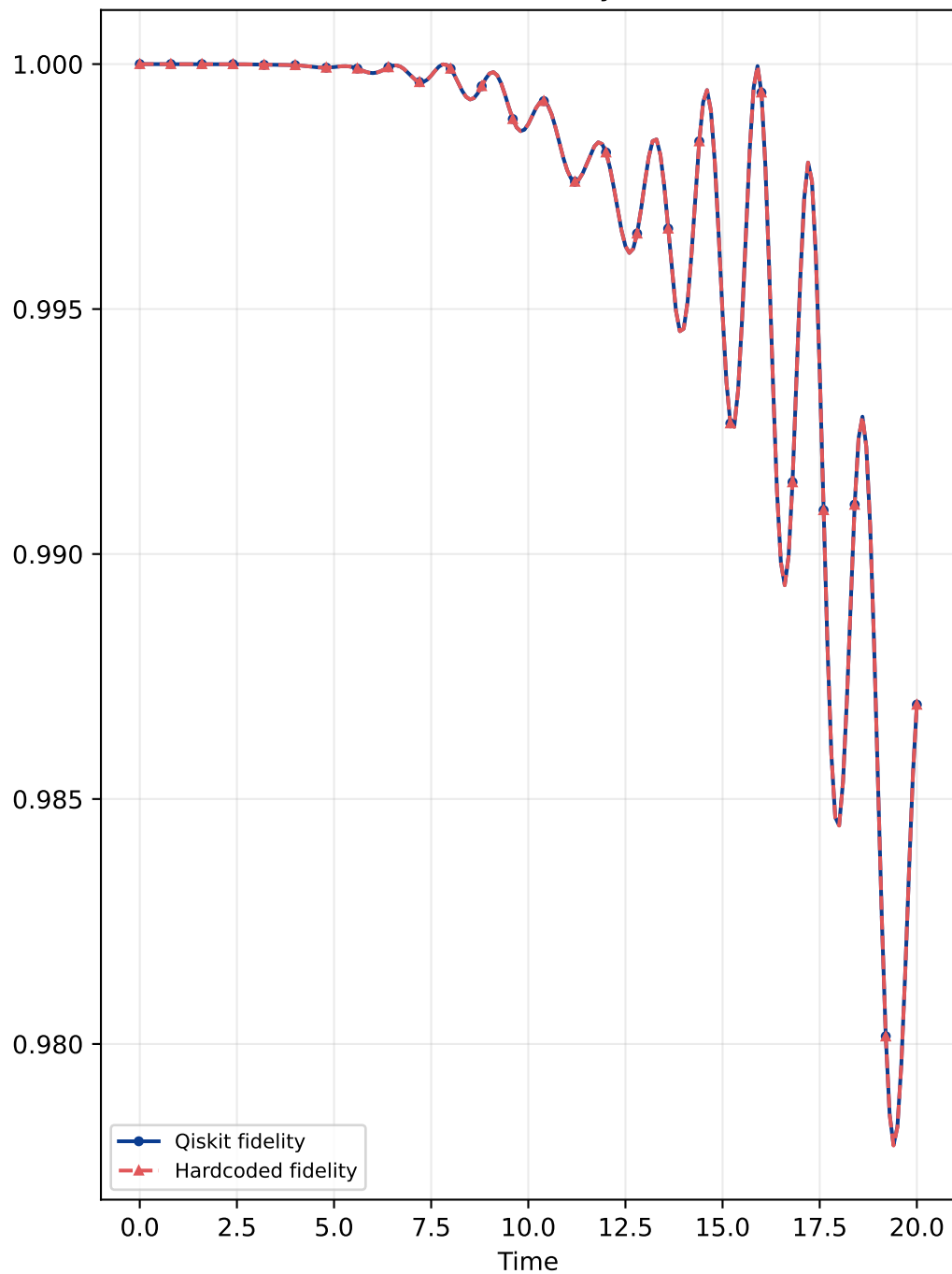


Bundle L=2: Run Settings & Metrics Summary

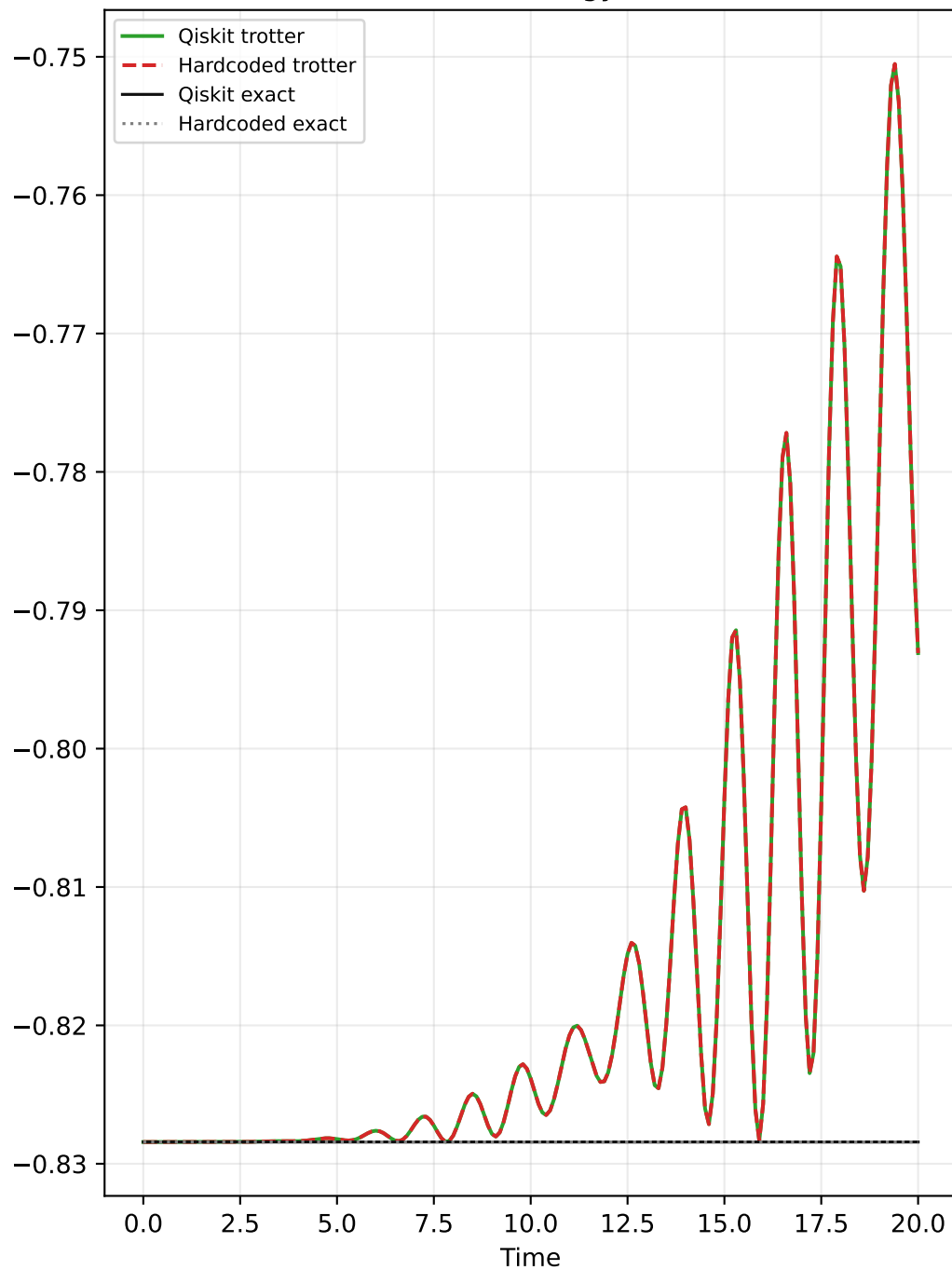
```
L=2  t=1.0  u=4.0  dv=0.0  boundary=periodic  ordering=blocked  initial_state_source=vqe  t_final=20.0  num_times=201  suz  
thresholds:  
  doublon_trotter_max_abs_delta: 1.00e-03  
  energy_trotter_max_abs_delta: 1.00e-03  
  fidelity_max_abs_delta: 1.00e-04  
  ground_state_energy_abs_delta: 1.00e-08  
  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

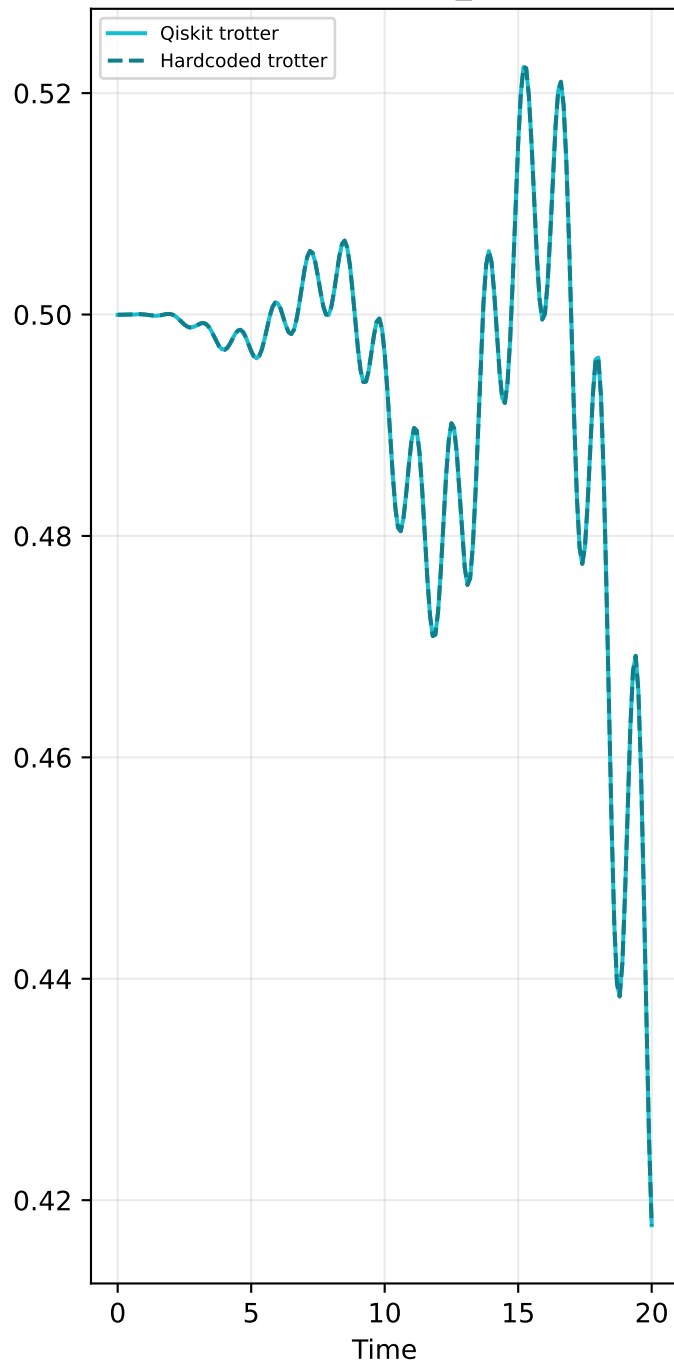


L=2 Energy

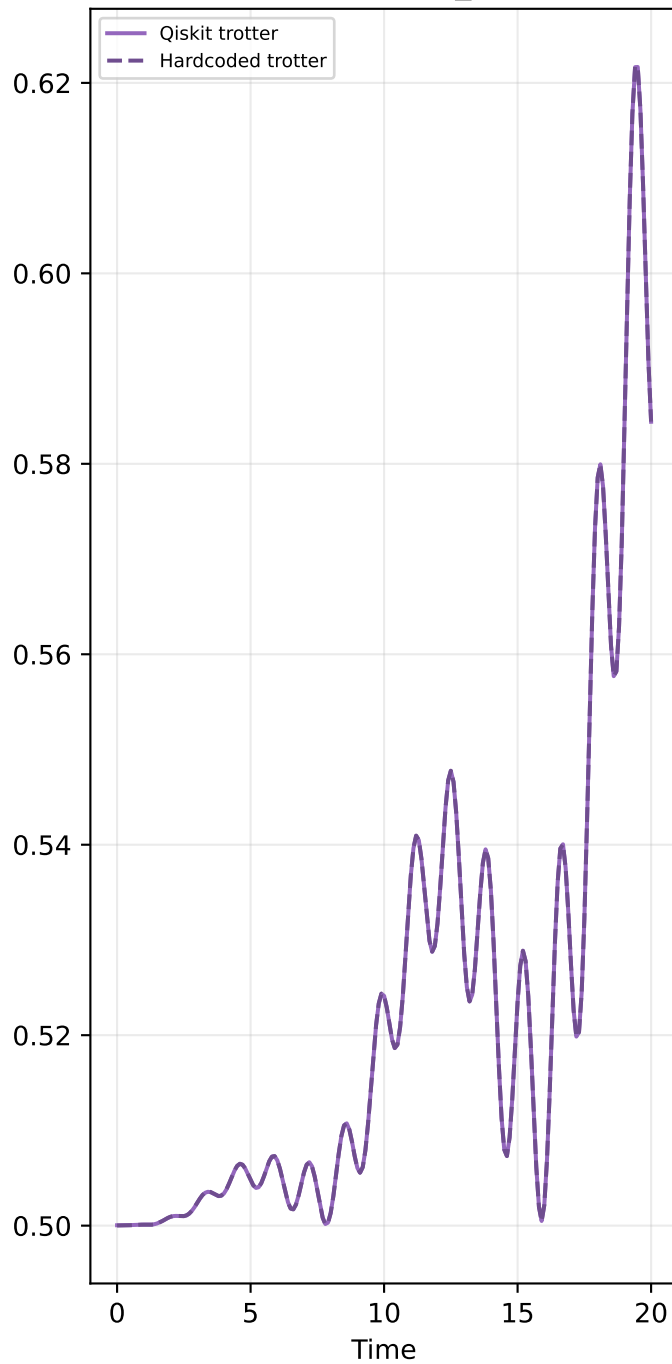


Bundle Page: L=2 Occupations & Doublon (auto-zoomed)

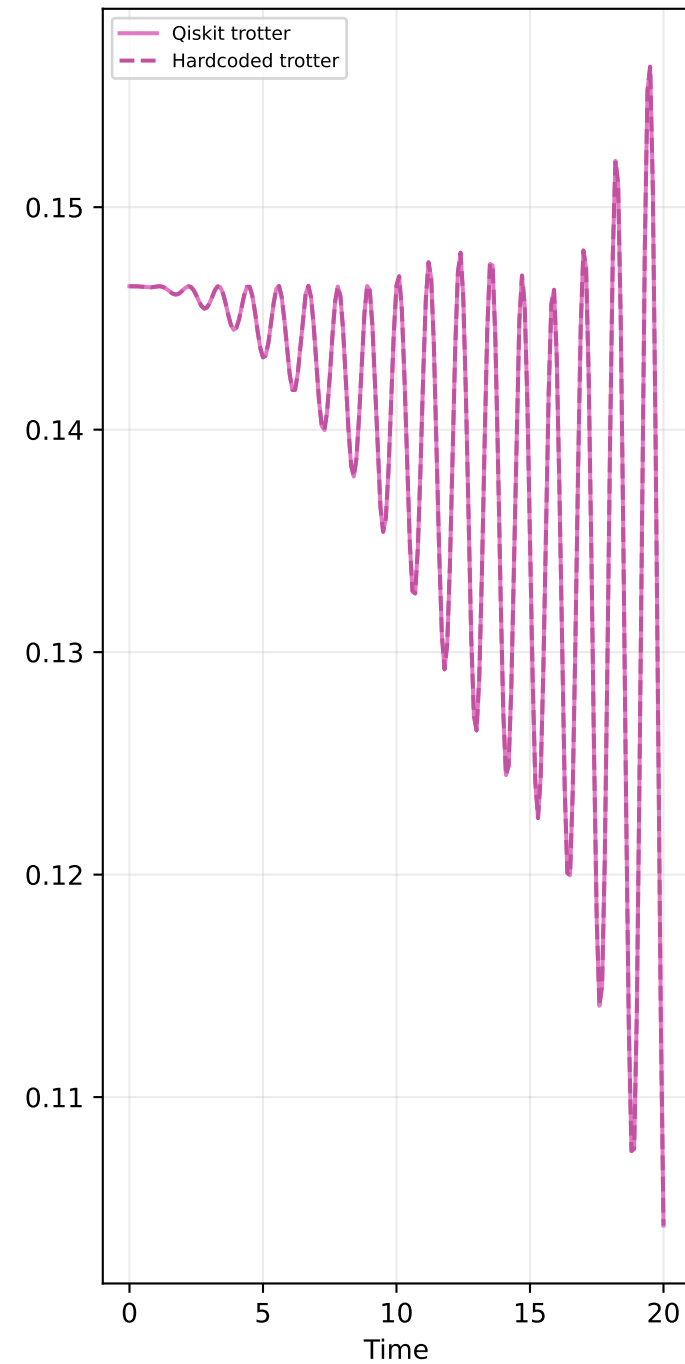
L=2 Site-0 n_{up}



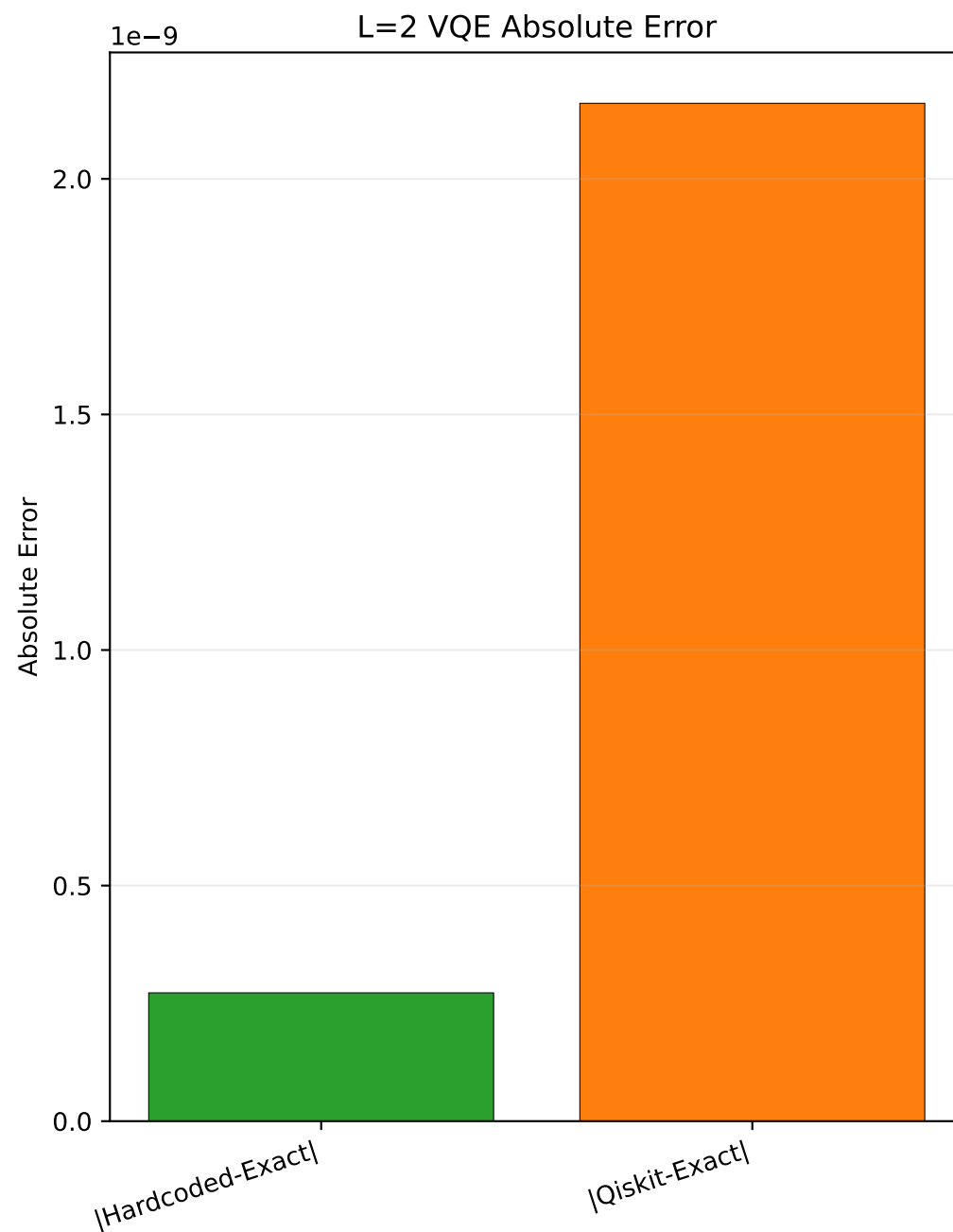
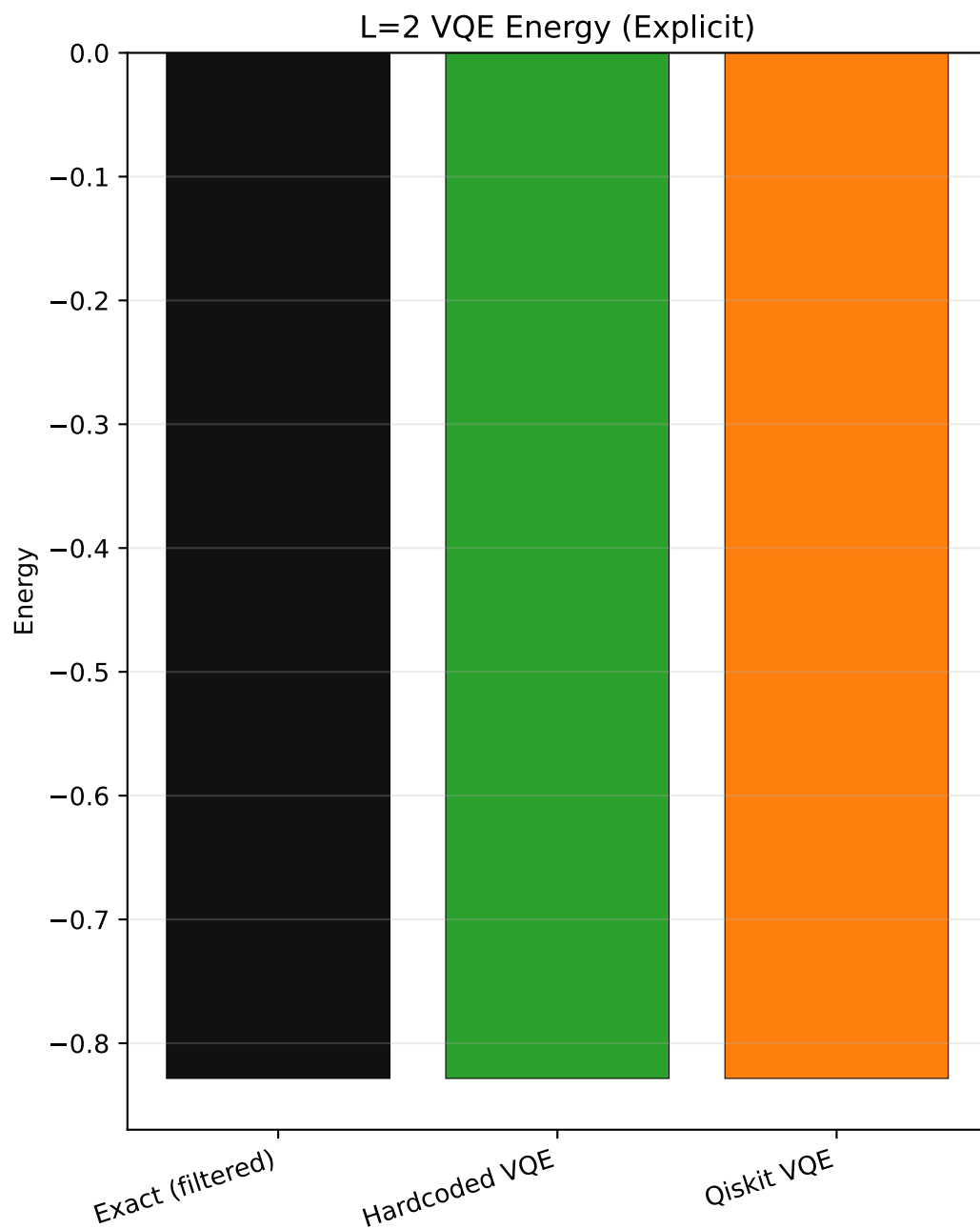
L=2 Site-0 n_{dn}



L=2 Doublon

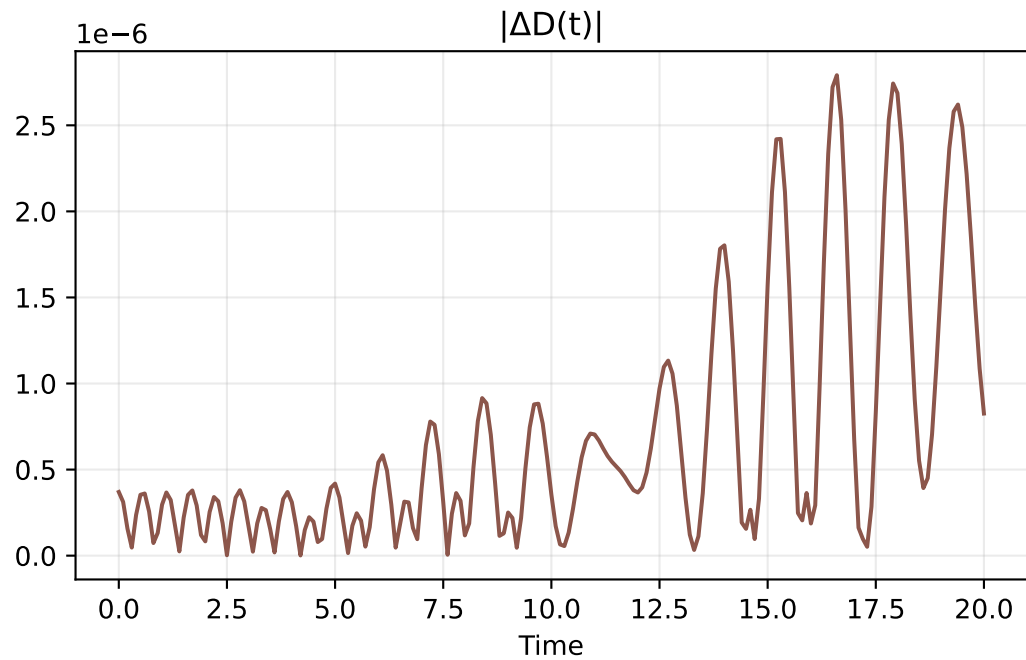
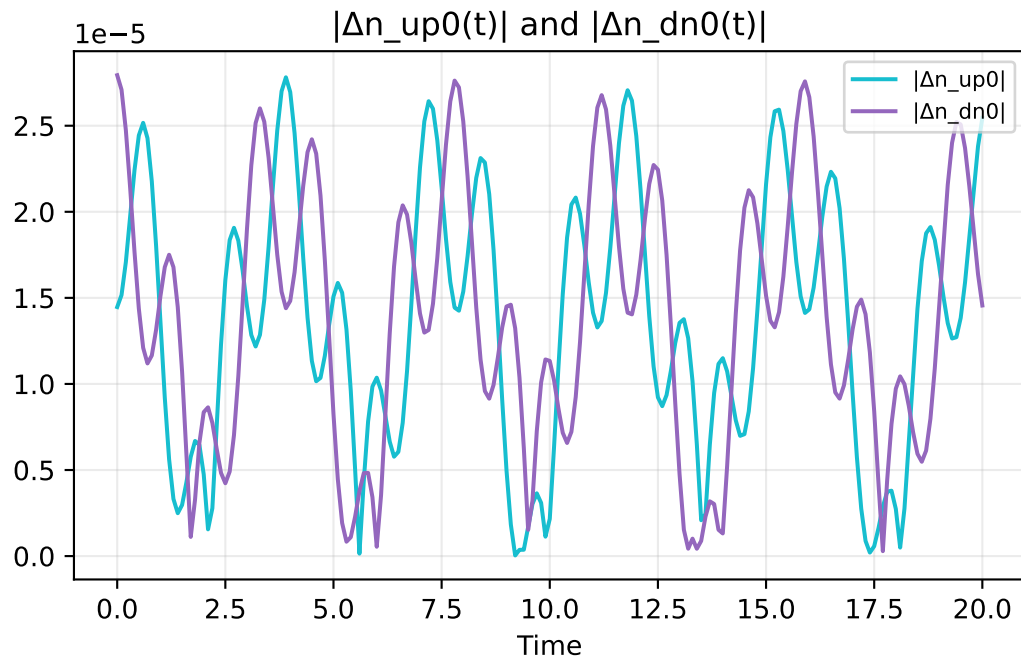
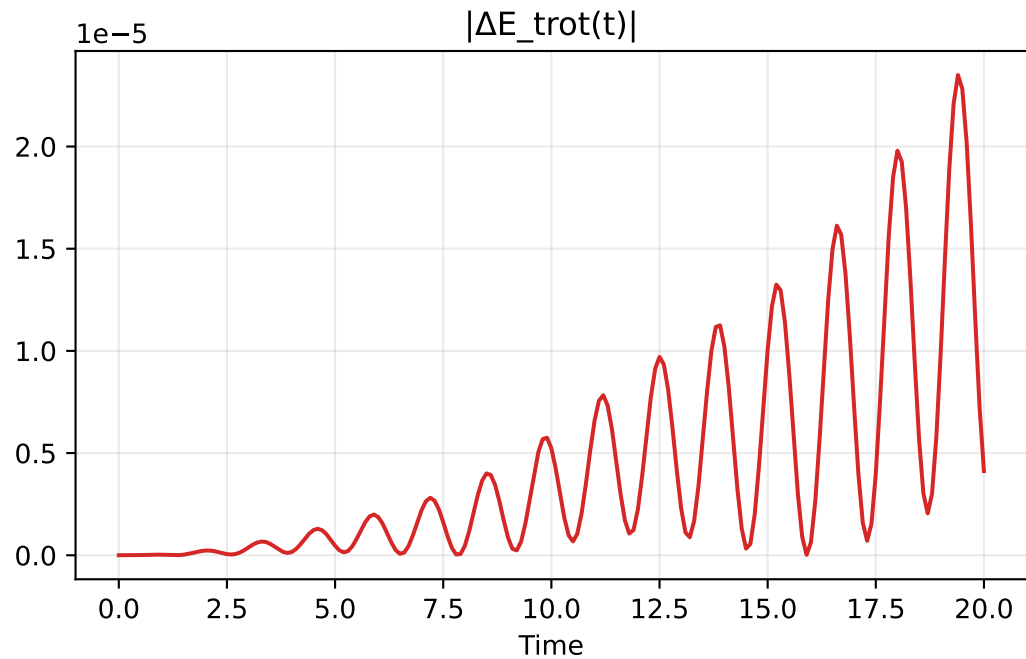
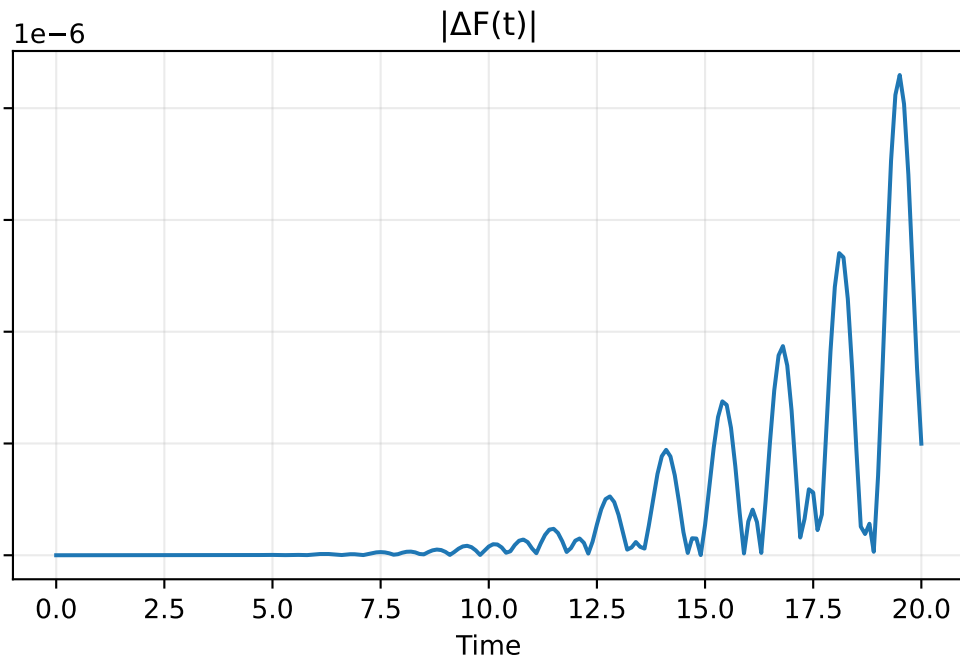


When initial_state_source=vqe, Trotter $E(t=0) = \langle \psi_{\text{vqe}} | H | \psi_{\text{vqe}} \rangle = \text{VQE energy}$.
VQE energy \neq exact ground state energy unless VQE fully converged.



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}
```

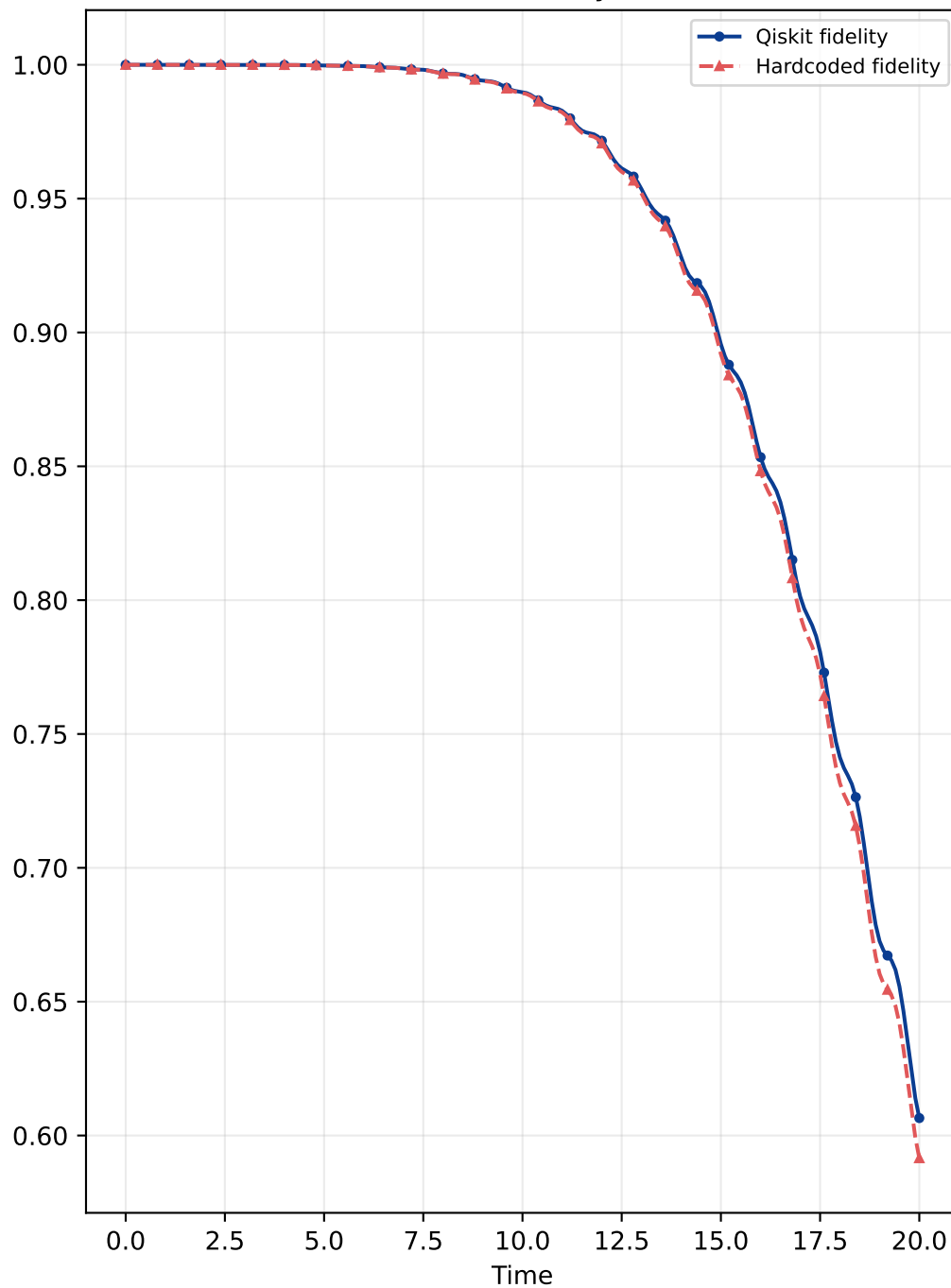
PASS = True

Bundle L=3: Run Settings & Metrics Summary

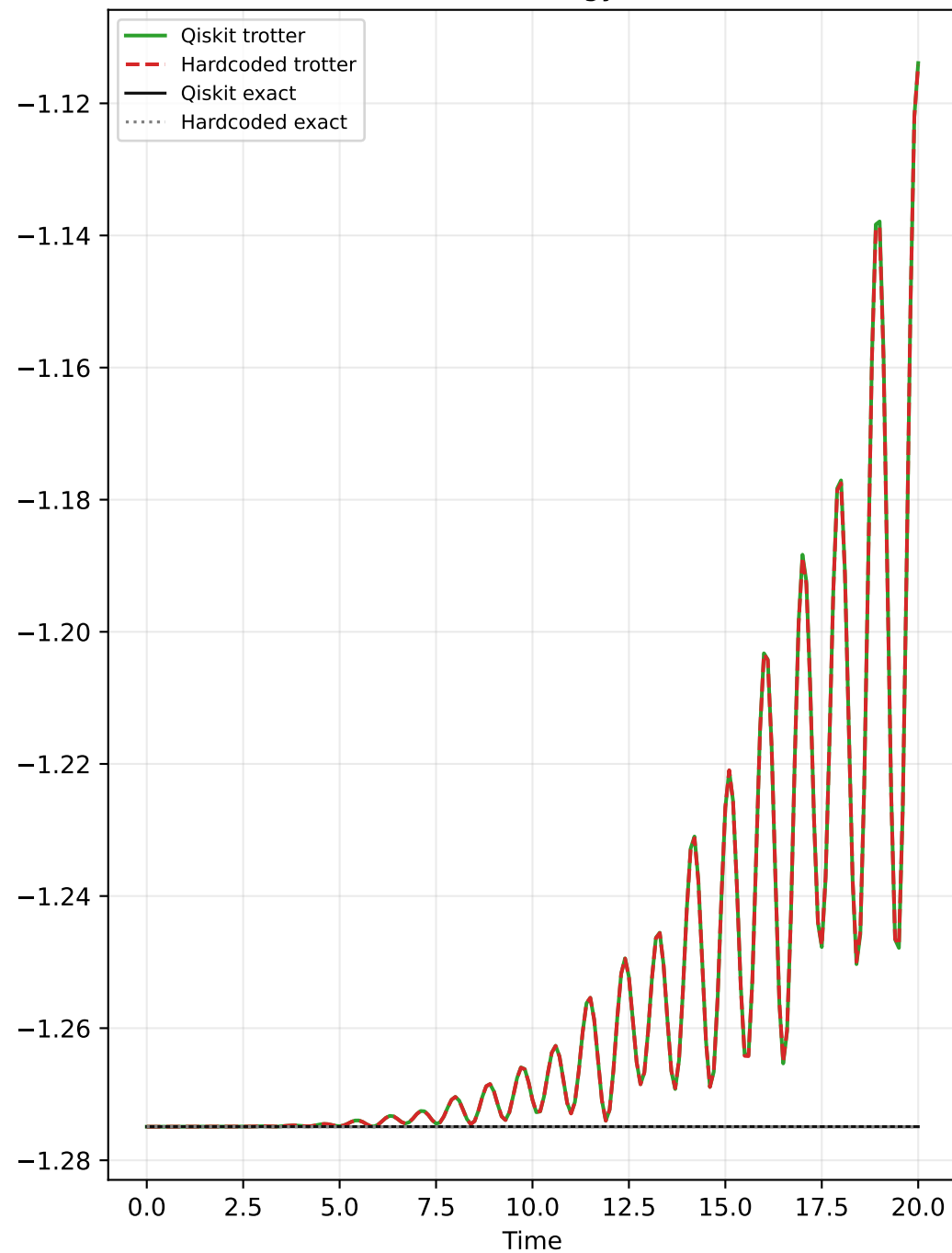
```
L=3  t=1.0  u=4.0  dv=0.0  boundary=periodic  ordering=blocked  initial_state_source=vqe  t_final=20.0  num_times=201  suz  
thresholds:  
  doublon_trotter_max_abs_delta: 1.00e-03  
  energy_trotter_max_abs_delta: 1.00e-03  
  fidelity_max_abs_delta: 1.00e-04  
  ground_state_energy_abs_delta: 1.00e-08  
  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

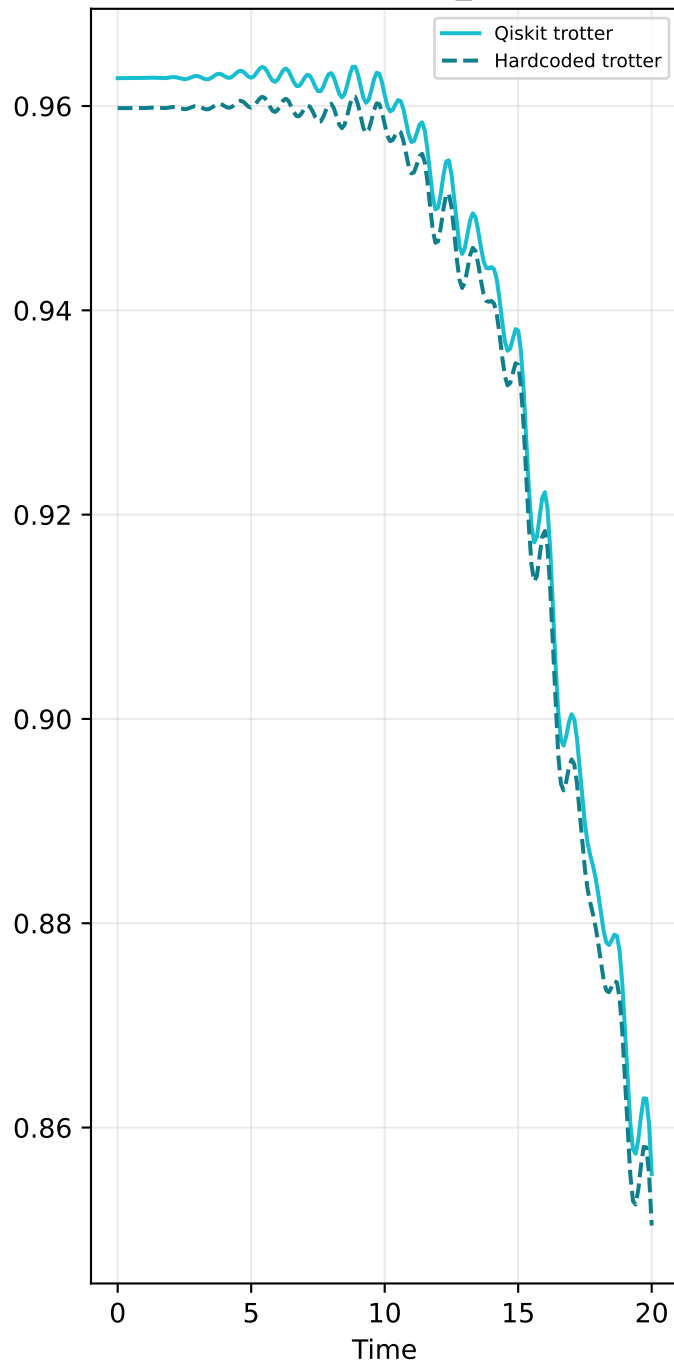


L=3 Energy

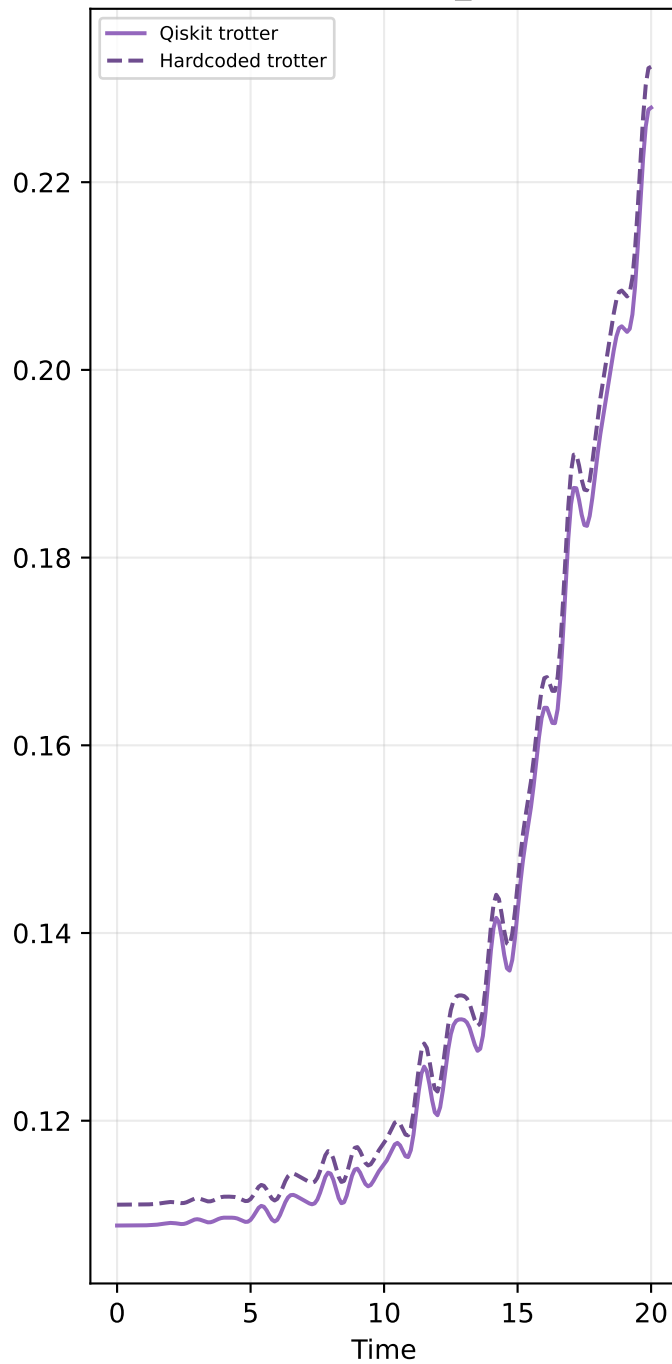


Bundle Page: L=3 Occupations & Doublon (auto-zoomed)

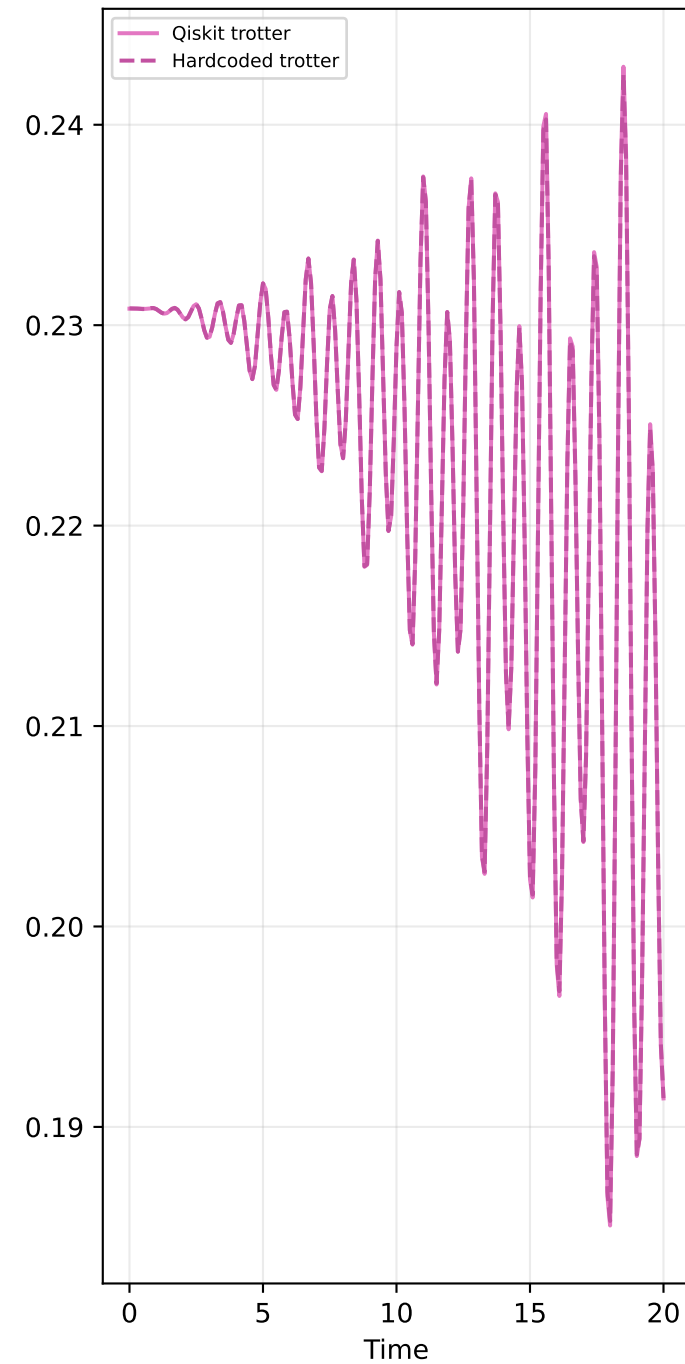
L=3 Site-0 n_{up}



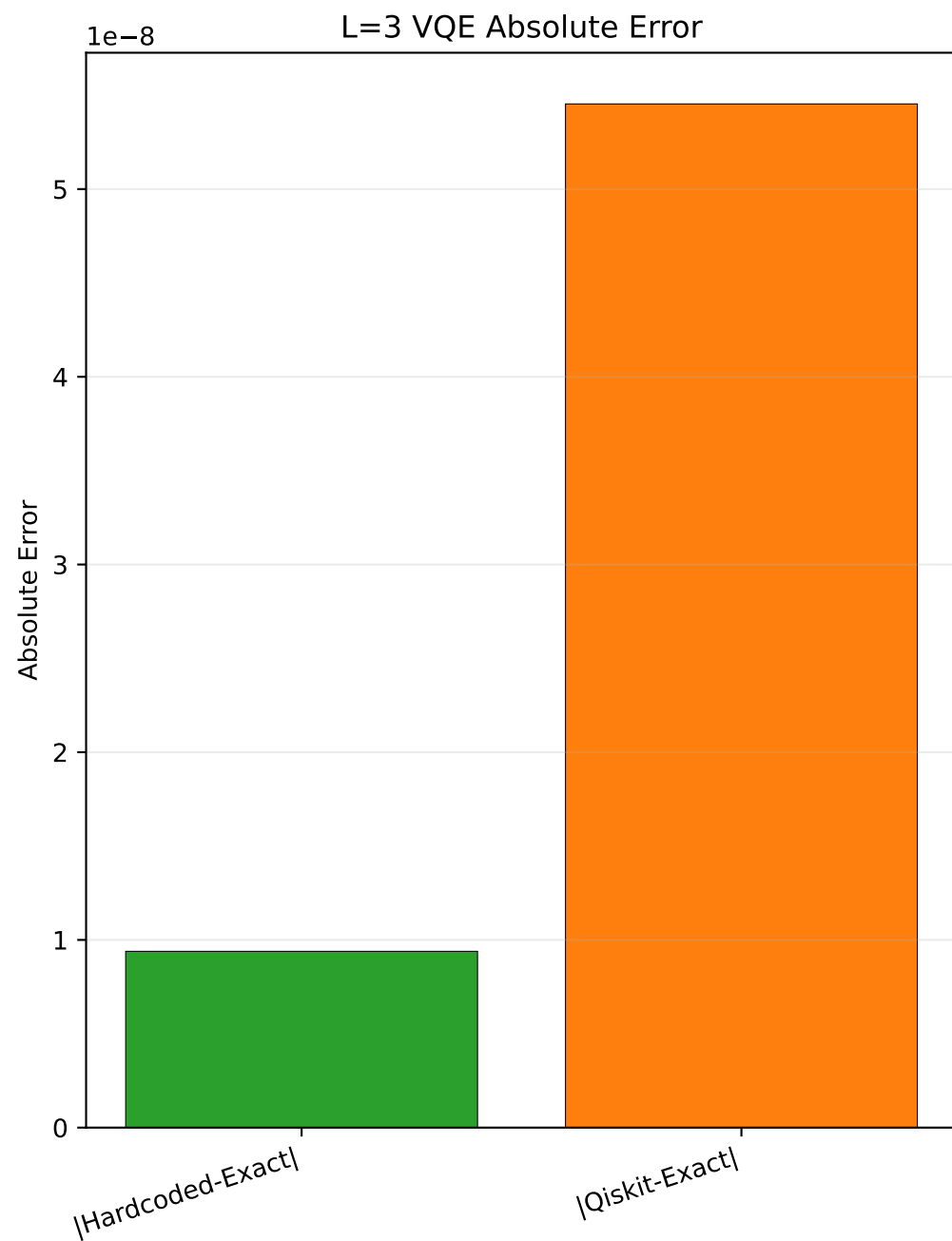
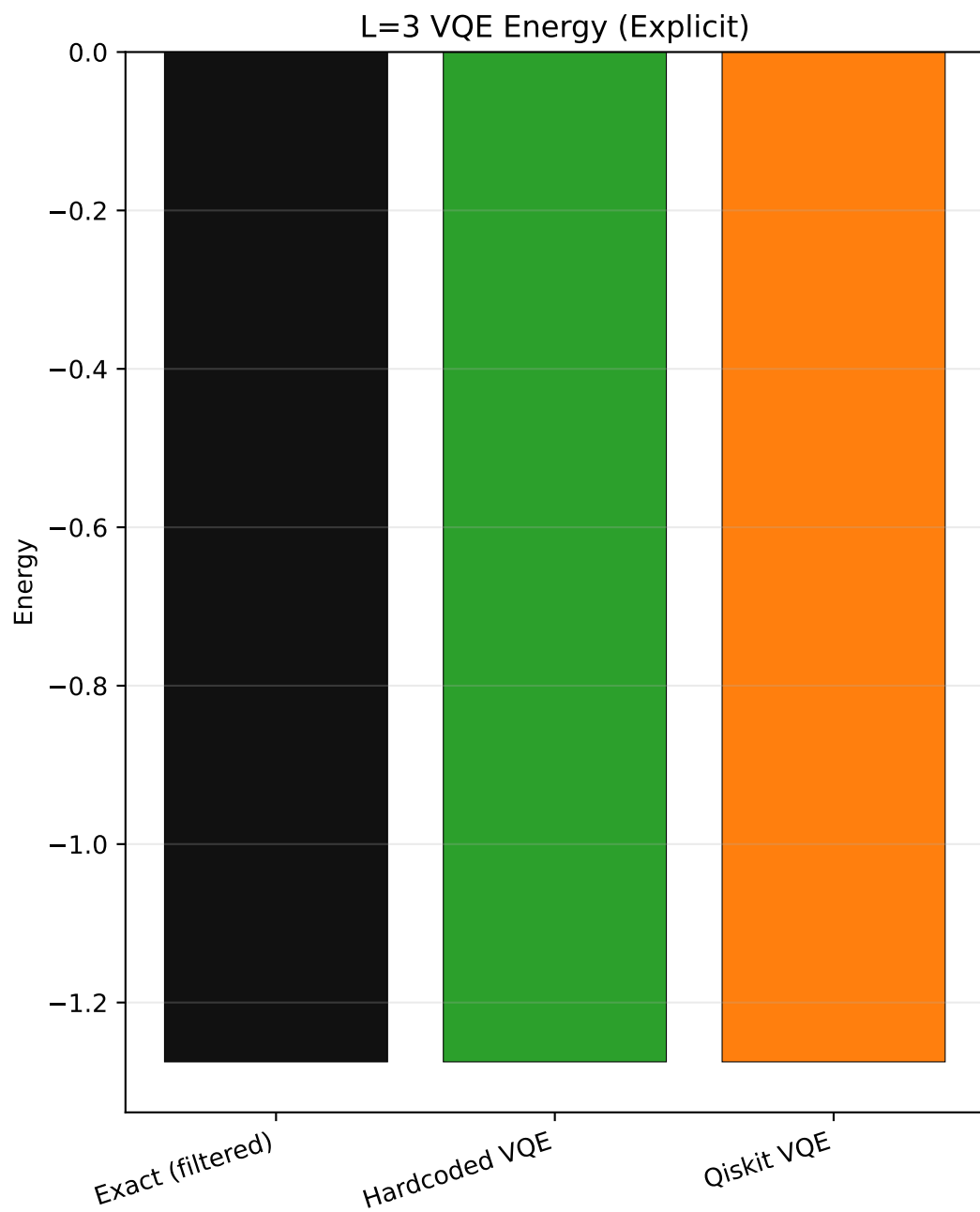
L=3 Site-0 n_{dn}



L=3 Doublon

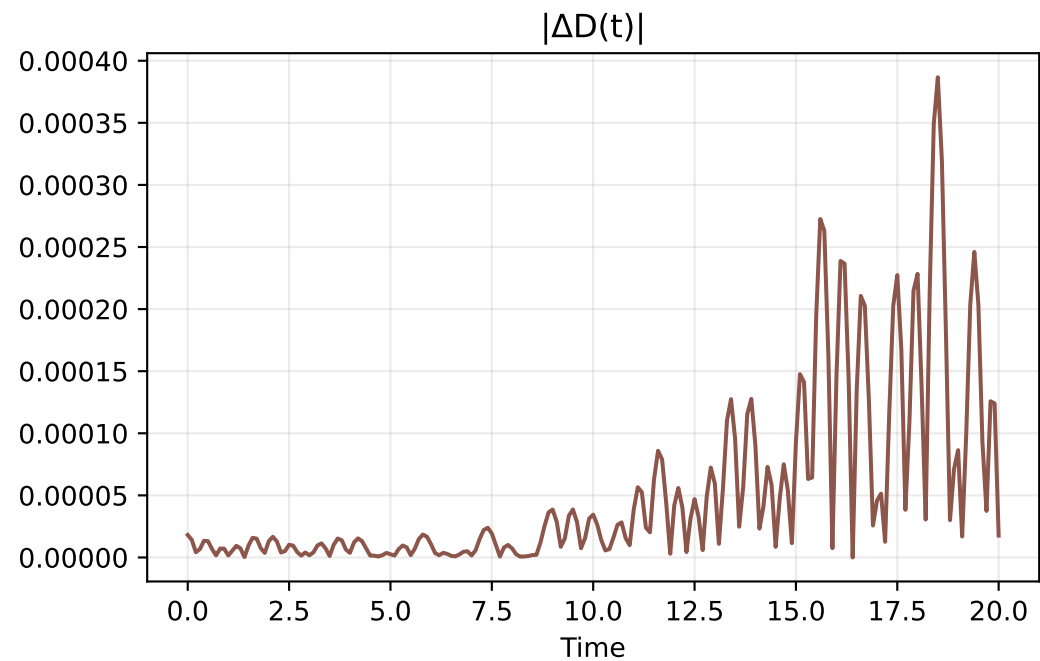
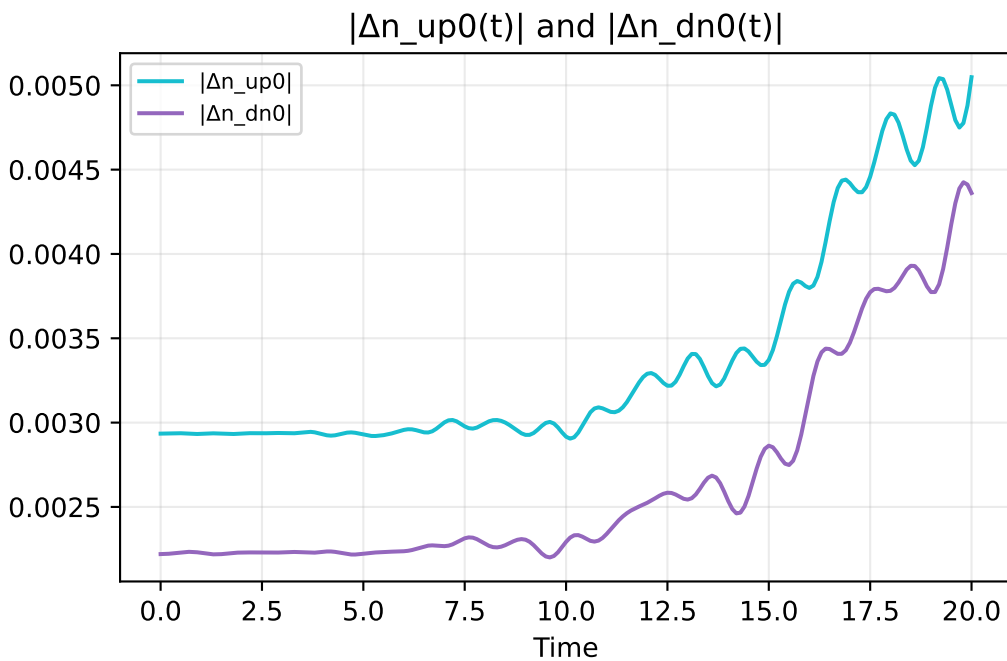
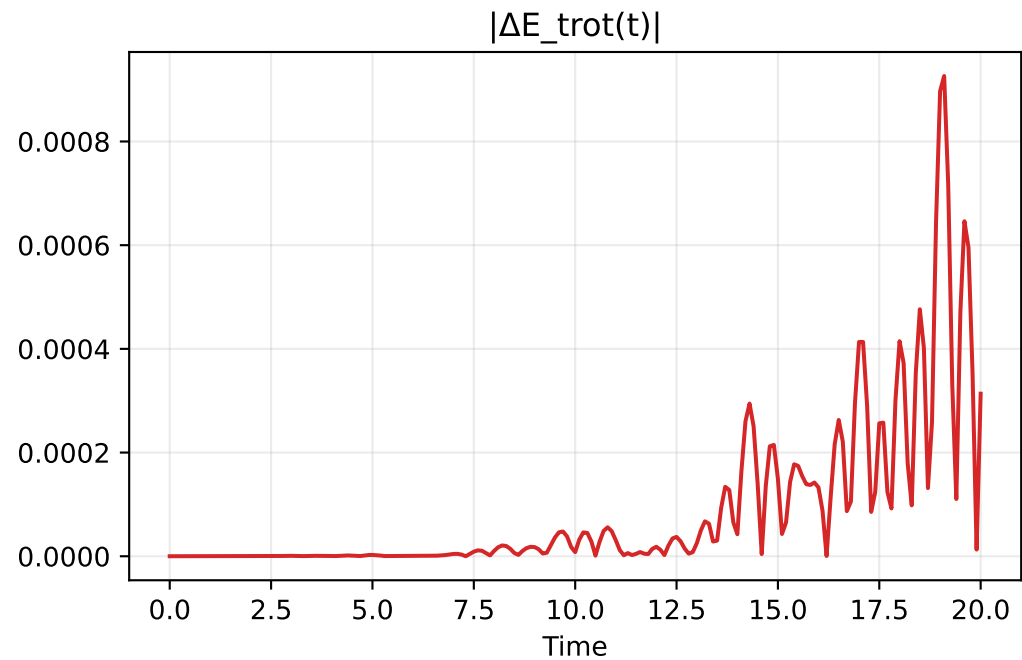
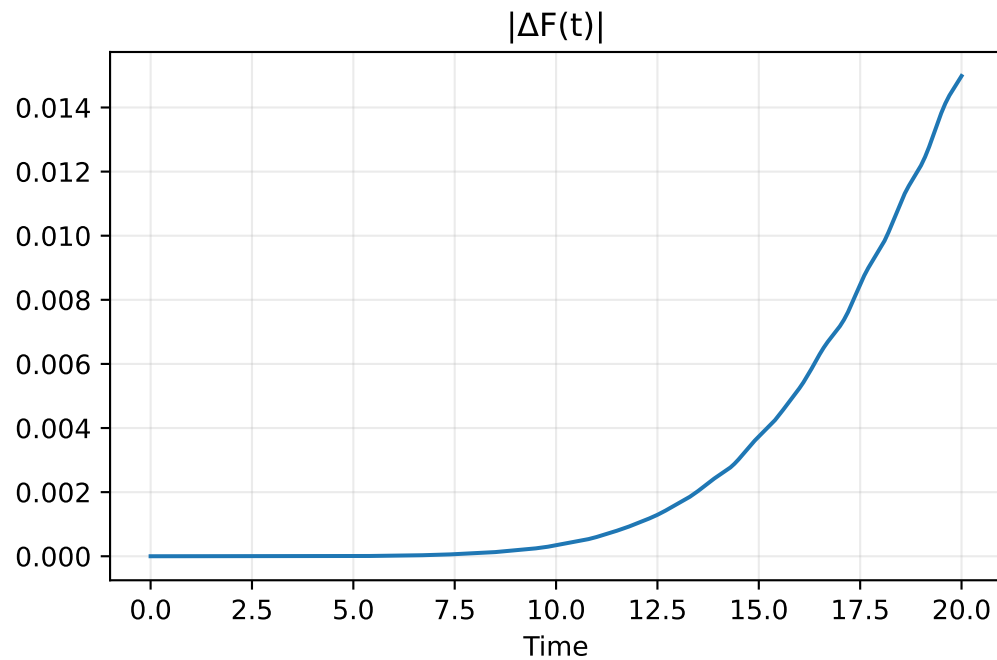


When initial_state_source=vqe, Trotter $E(t=0) = \langle \psi_{\text{vqe}} | H | \psi_{\text{vqe}} \rangle = \text{VQE energy}$.
VQE energy \neq exact ground state energy unless VQE fully converged.



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.



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:

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$$\Delta E_{trot}(t) = |E_{trot_{hc}}(t) - E_{trot_{qk}}(t)|$$

$$\Delta n_{up0}(t) = |n_{up0_{hc}}(t) - n_{up0_{qk}}(t)|$$

$$\Delta n_{dn0}(t) = |n_{dn0_{hc}}(t) - n_{dn0_{qk}}(t)|$$

$$\Delta D(t) = |D_{hc}(t) - D_{qk}(t)|$$

$F_{pipeline}(t)$ 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