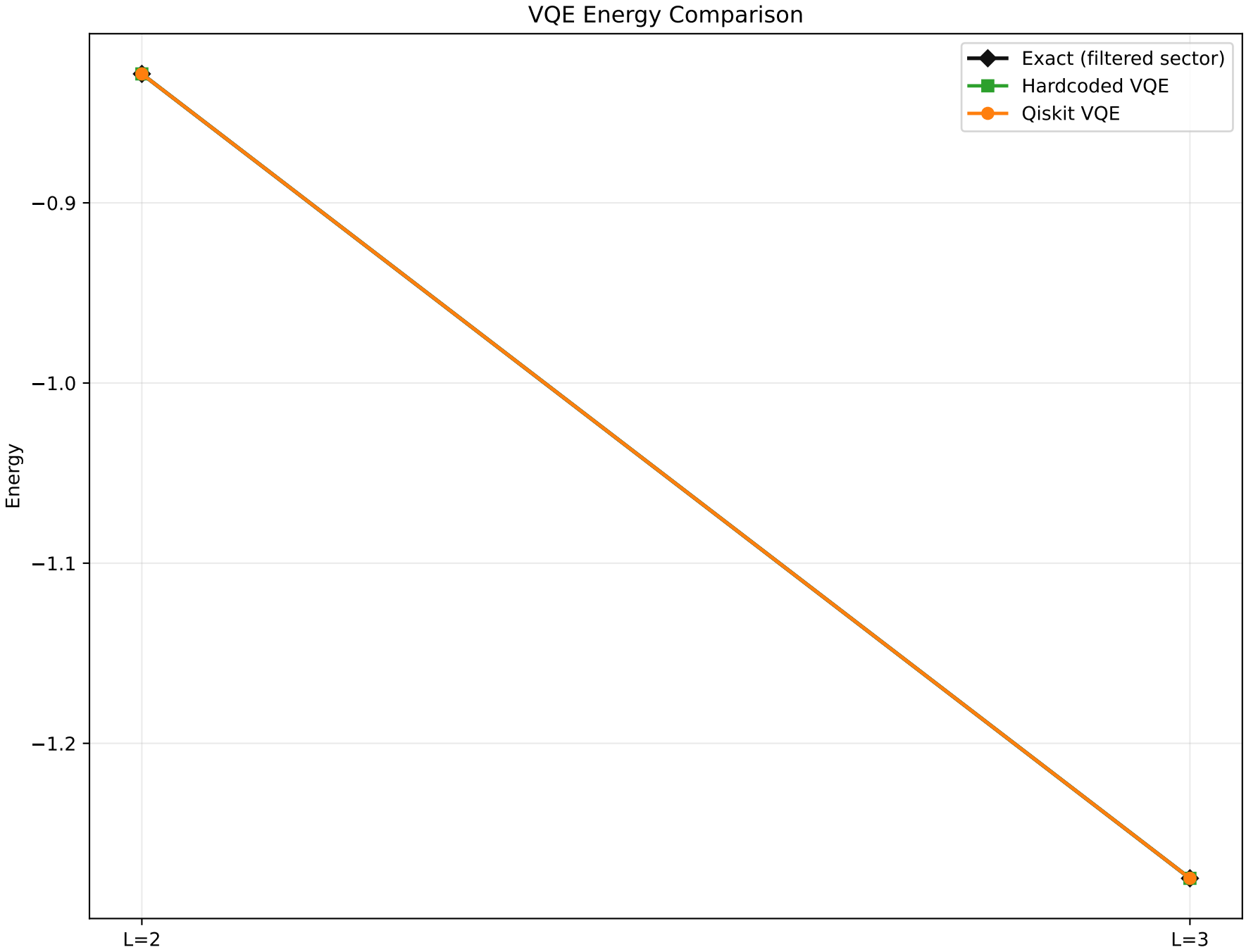
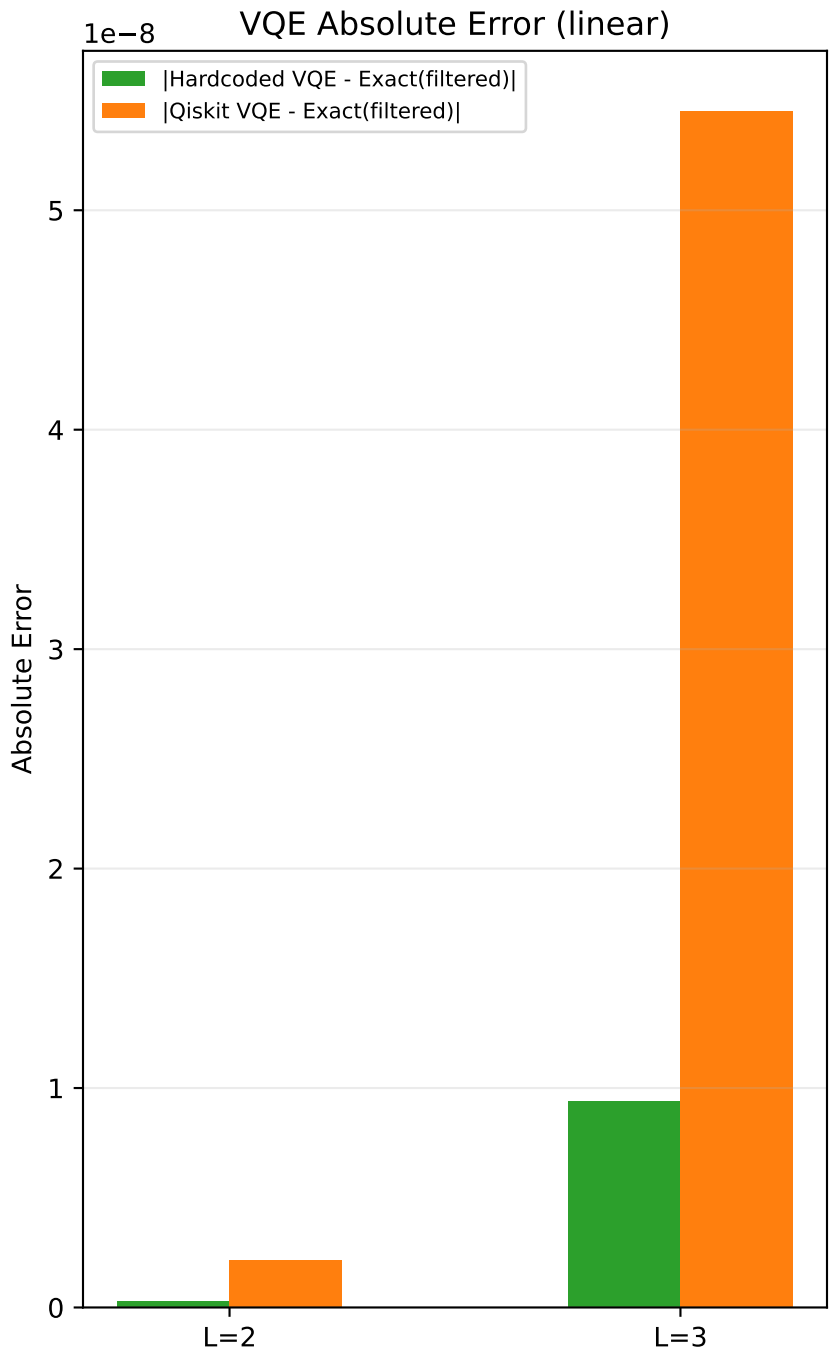
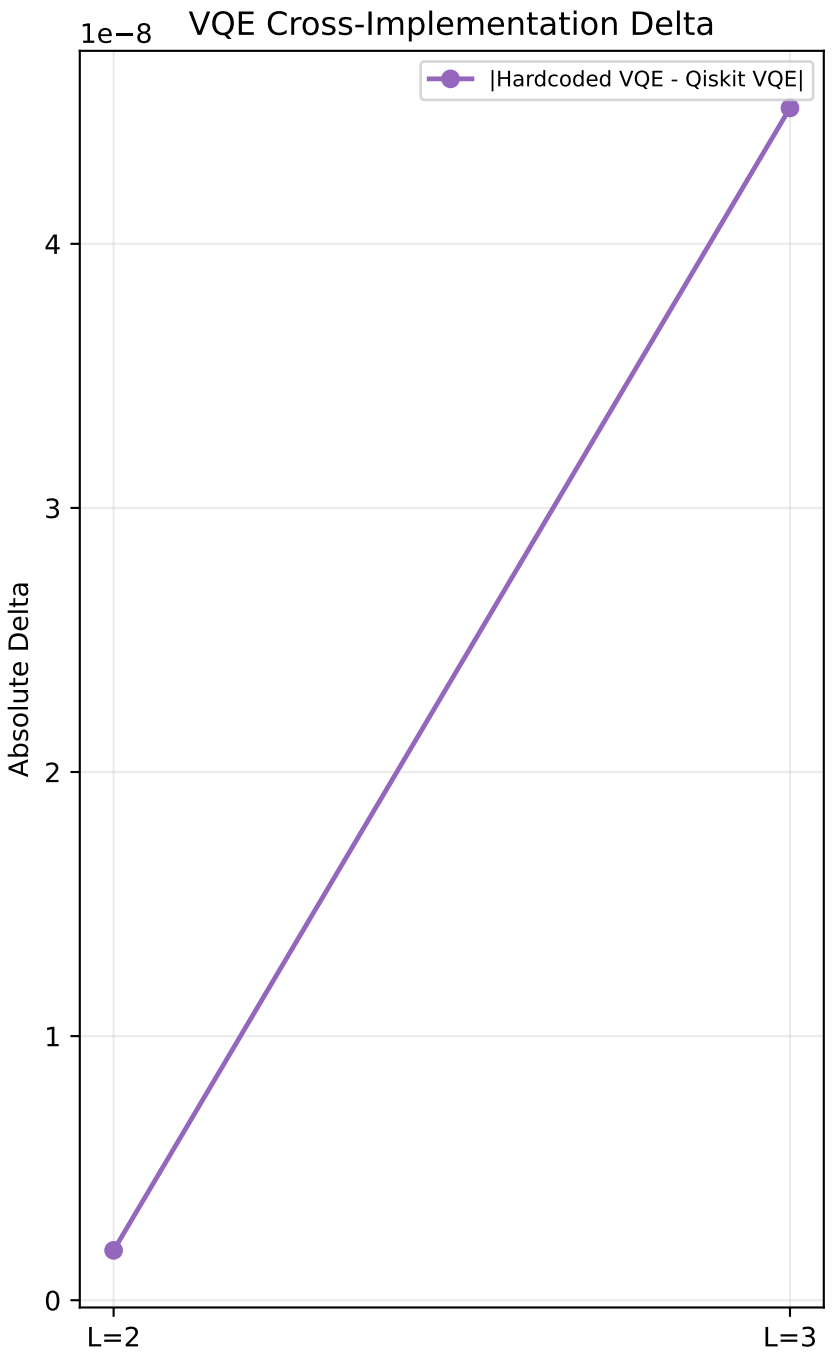
```
Hardcoded vs Qiskit Pipeline Comparison Summary

generated_utc: 2026-02-14T00:18:24.073039+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)|
```

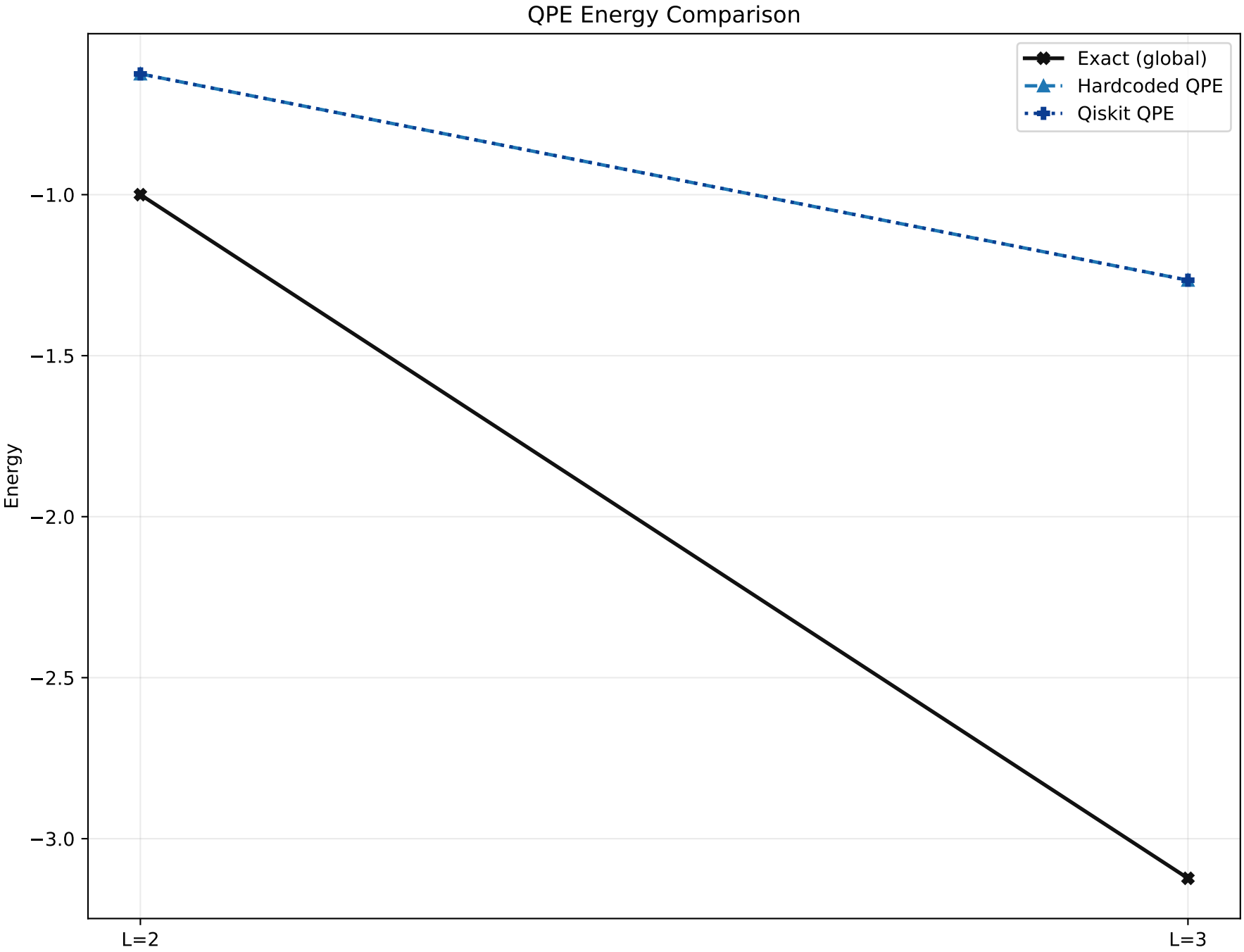
F_pipeline(t) is the pipeline's stored trajectory fidelity value (as computed internally vs that pipeline's exact evolution).

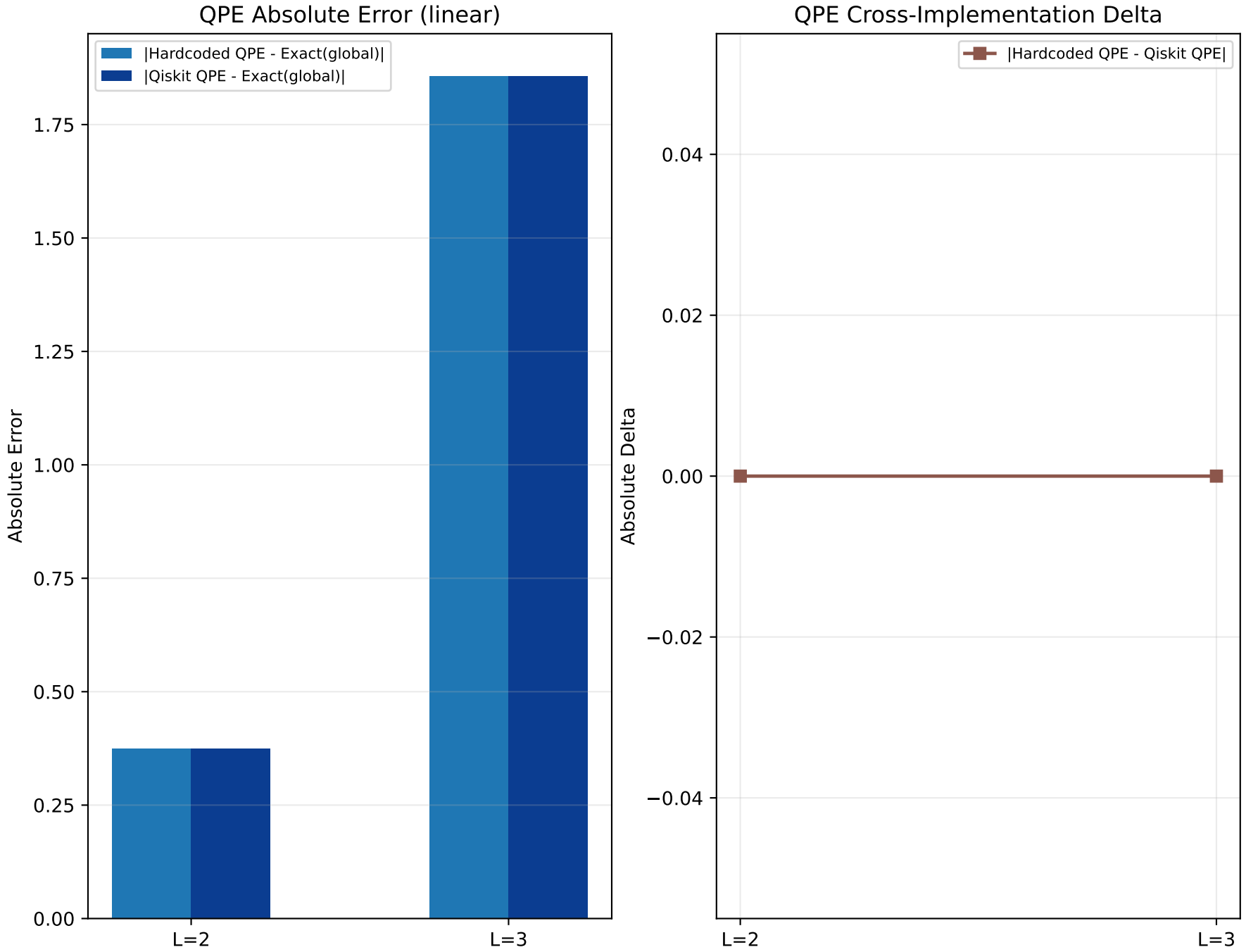
Per-L pass flags:
L=2 pass=True metrics_json=/Users/jakestrobel/Downloads/Testing-For-Trying-Again-main_copy-testforatestcuziknothing/artifacts/hardcoded_vs_qiskit_pipeline_L2_metrics.json
L=3 pass=False metrics_json=/Users/jakestrobel/Downloads/Testing-For-Trying-Again-main_copy-testforatestcuziknothing/artifacts/hardcoded_vs_qiskit_pipeline_L3_metrics.json

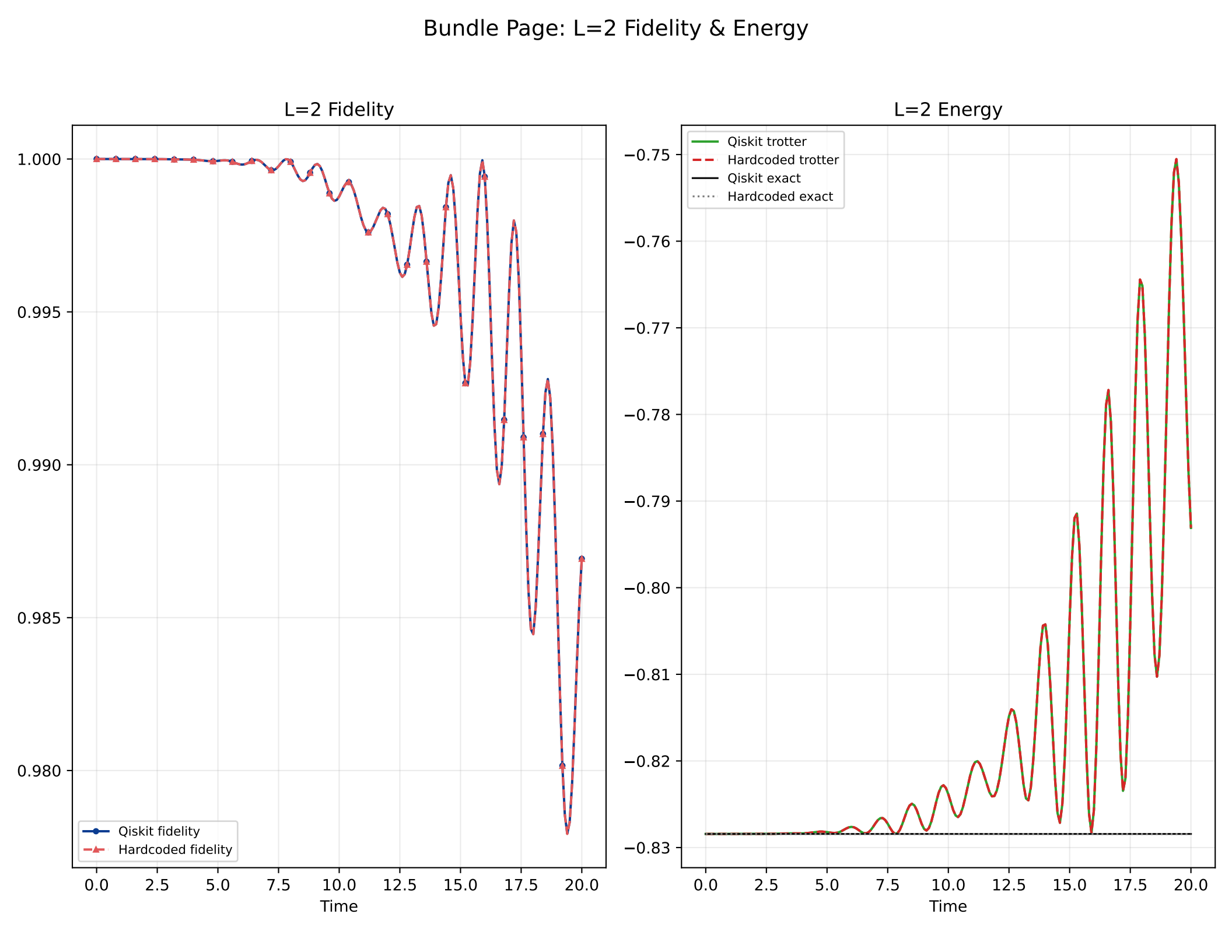

VQE Energy Comparison
Exact (filtered sector)
Hardcoded VQE
Qiskit VQE
Energy
−0.9
−1.0
−1.1
−1.2
L=2
L=3

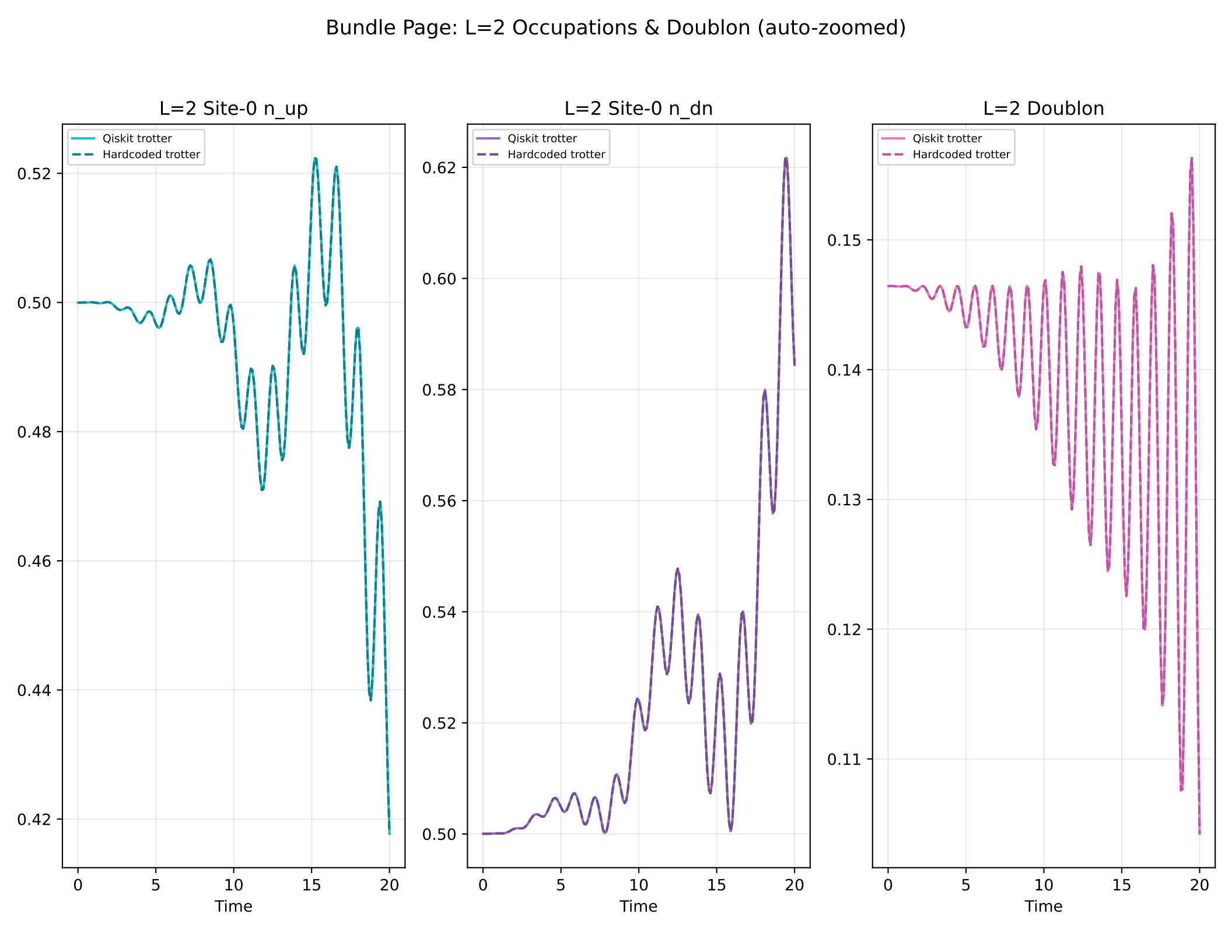

VQE Absolute Error (linear)
1e−8
|Hardcoded VQE - Exact(filtered)|
|Qiskit VQE - Exact(filtered)|
Absolute Error
0
1
2
3
4
5
L=2
L=3


VQE Cross-Implementation Delta
1e−8
|Hardcoded VQE - Qiskit VQE|
Absolute Delta
0
1
2
3
4
L=2
L=3

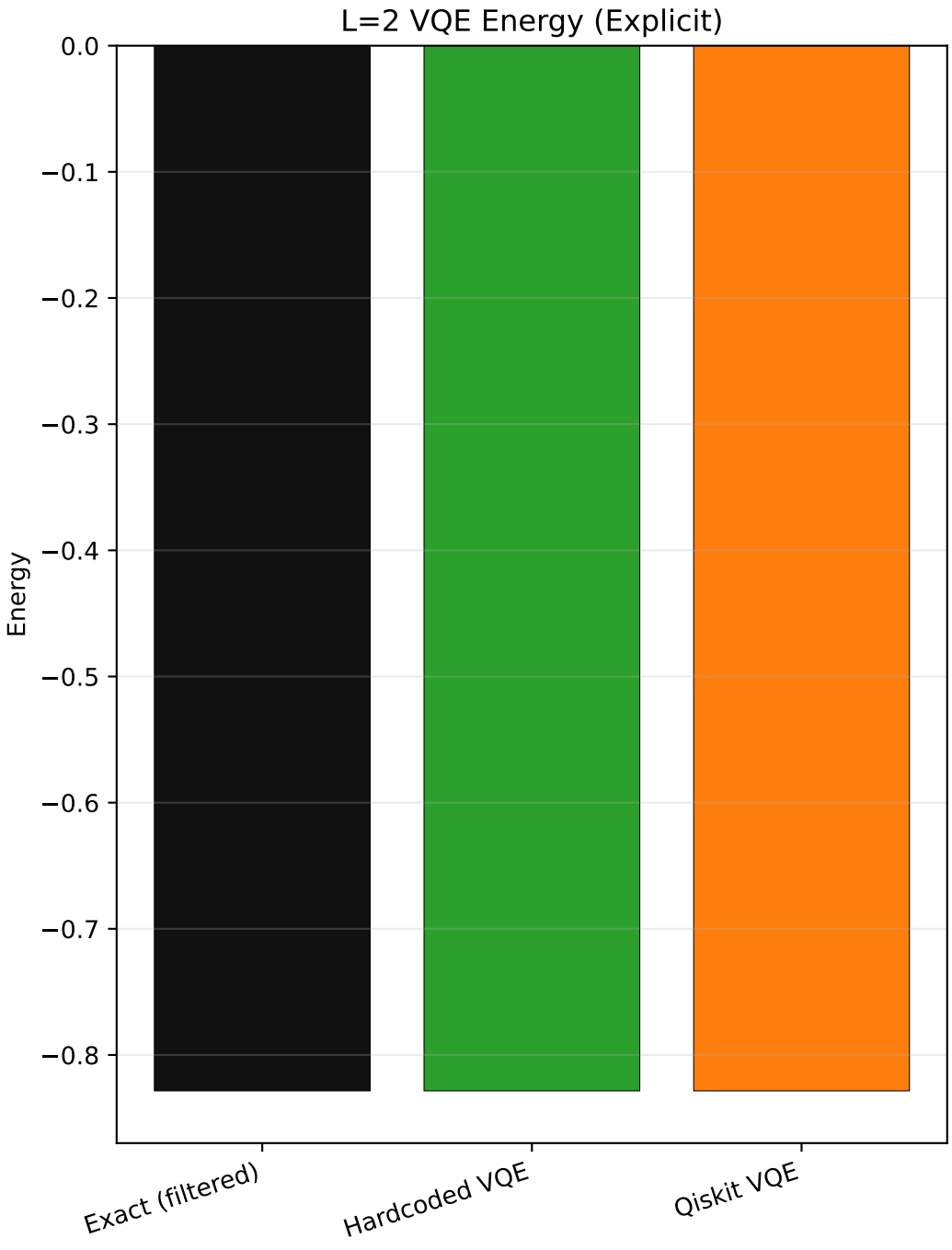

QPE Energy Comparison
Exact (global)
Hardcoded QPE
Qiskit QPE
Energy
−1.0
−1.5
−2.0
−2.5
−3.0
L=2
L=3

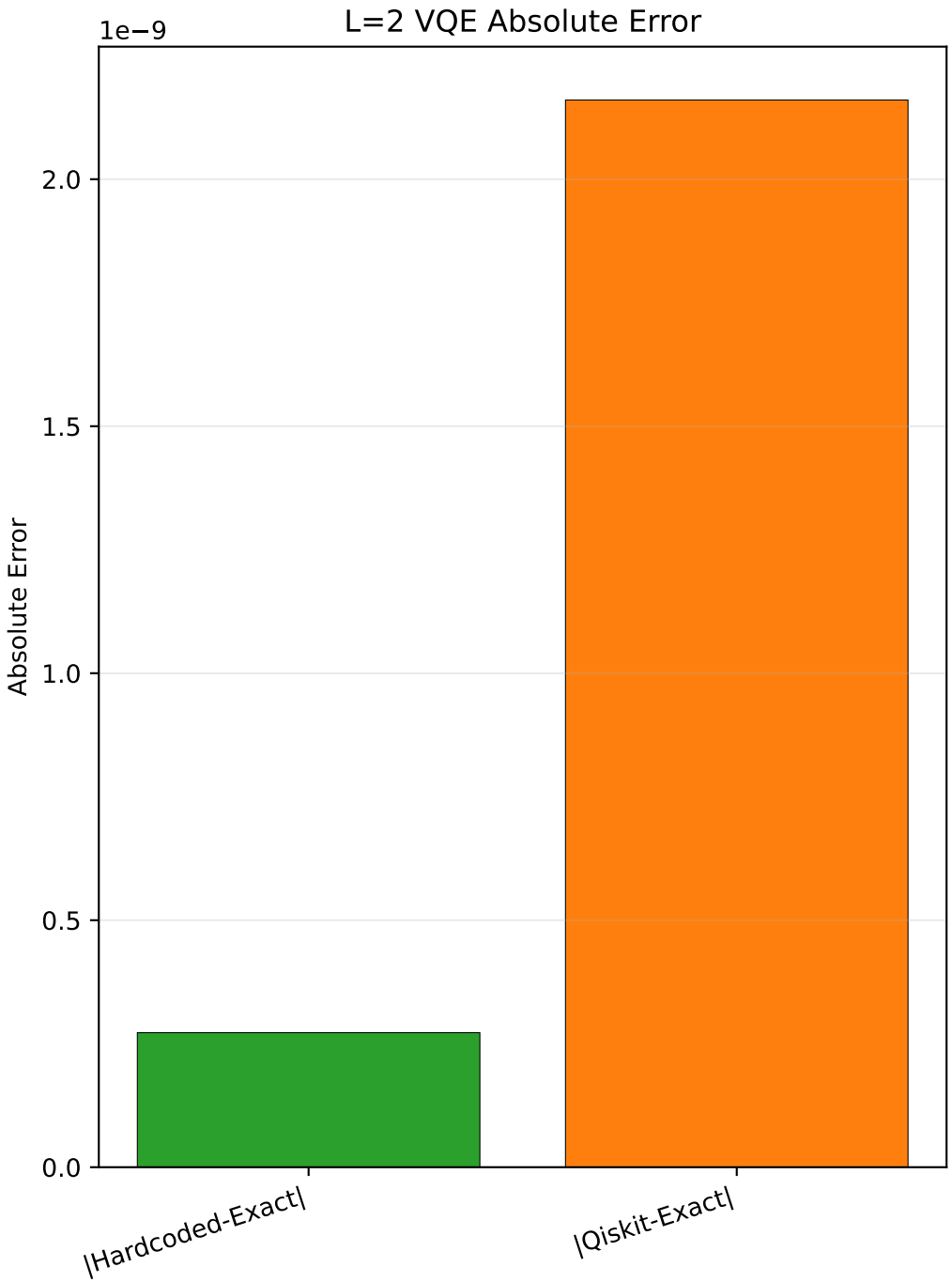

QPE Absolute Error (linear)
|Hardcoded QPE - Exact(global)|
|Qiskit QPE - Exact(global)|
Absolute Error
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
L=2
L=3
QPE Cross-Implementation Delta
|Hardcoded QPE - Qiskit QPE|
Absolute Delta
0.04
0.02
0.00
−0.02
−0.04
L=2
L=3

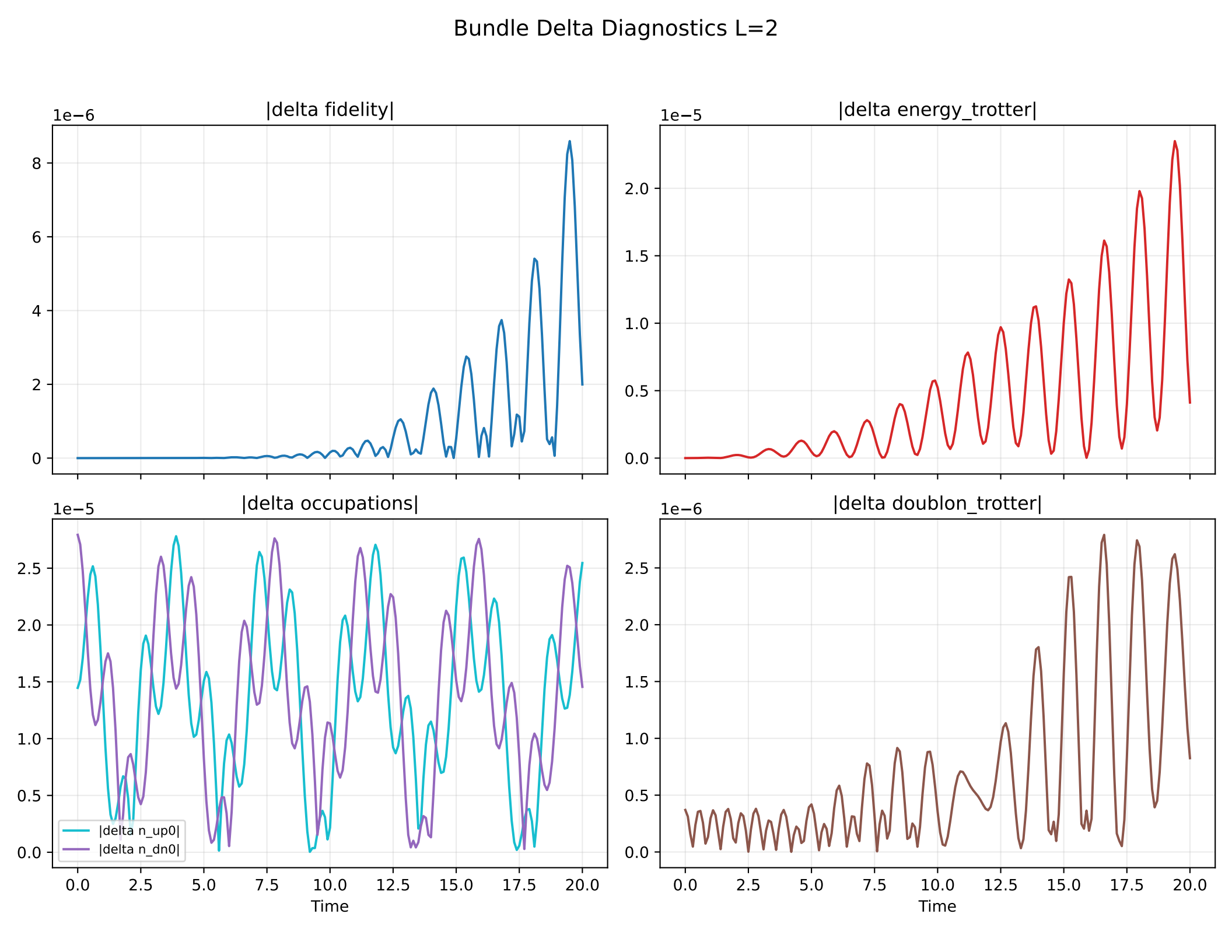

Bundle Page: L=2 Fidelity & Energy
L=2 Fidelity
1.000
0.995
0.990
0.985
0.980
Qiskit fidelity
Hardcoded fidelity
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
Time
L=2 Energy
−0.75
−0.76
−0.77
−0.78
−0.79
−0.80
−0.81
−0.82
−0.83
Qiskit trotter
Hardcoded trotter
Qiskit exact
Hardcoded exact
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
Time


Bundle Page: L=2 Occupations & Doublon (auto-zoomed)
L=2 Site-0 n_up
Qiskit trotter
Hardcoded trotter
0.52
0.50
0.48
0.46
0.44
0.42
0
5
10
15
20
Time
L=2 Site-0 n_dn
Qiskit trotter
Hardcoded trotter
0.62
0.60
0.58
0.56
0.54
0.52
0.50
0
5
10
15
20
Time
L=2 Doublon
Qiskit trotter
Hardcoded trotter
0.15
0.14
0.13
0.12
0.11
0
5
10
15
20
Time

VQE is a separate quantity from the Trotter t=0 value; do not infer VQE energy from trajectory plots.

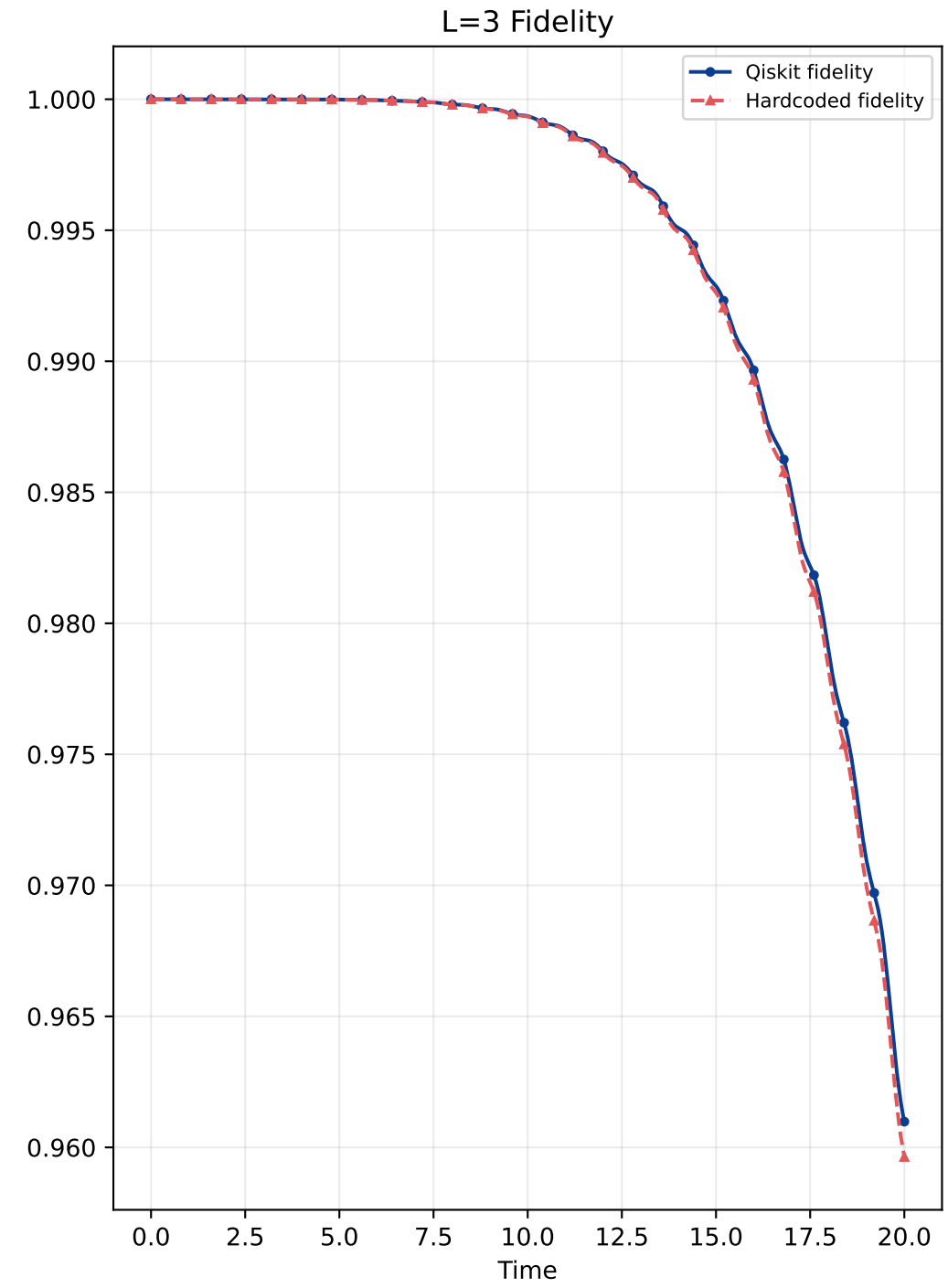


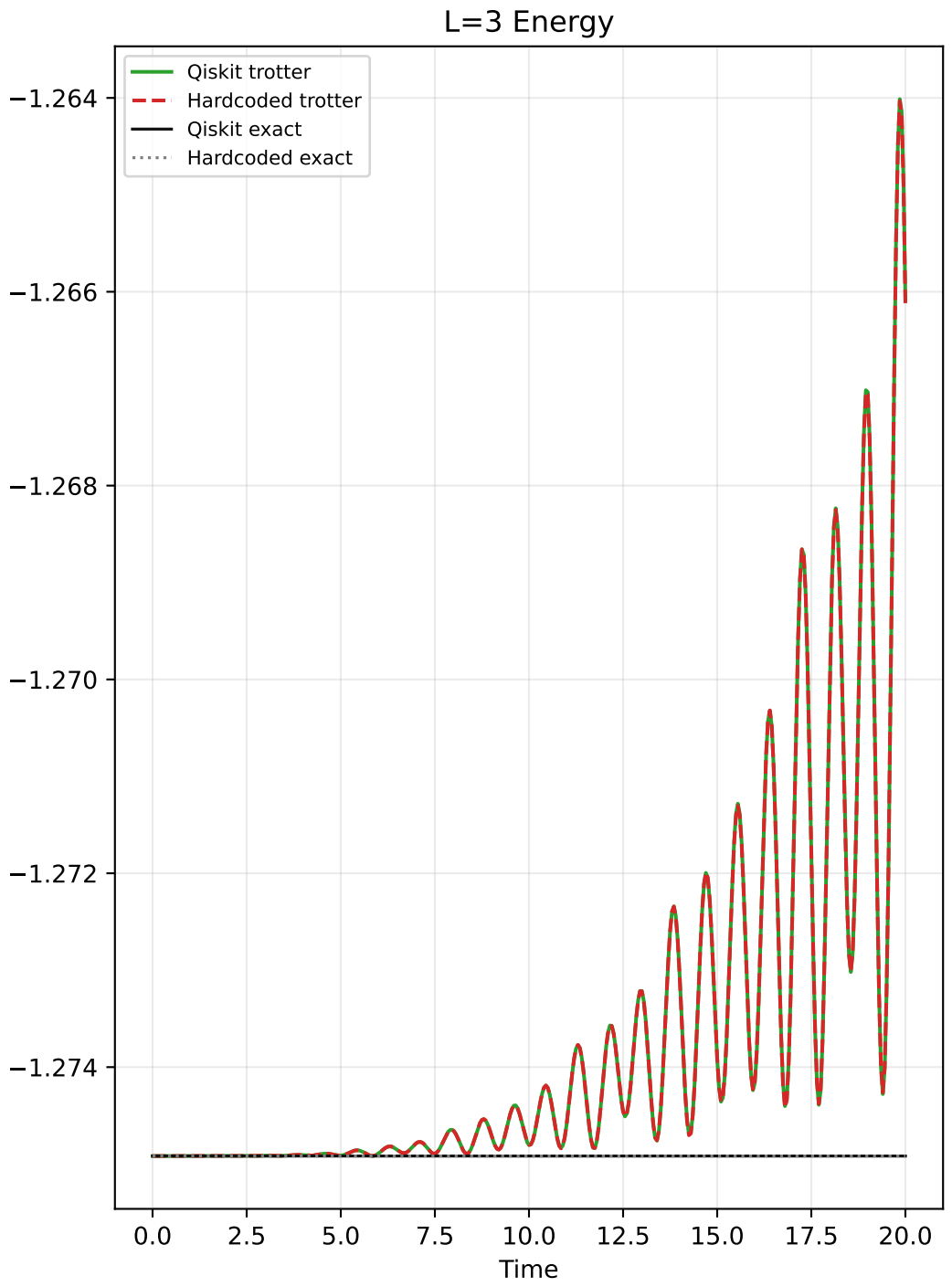


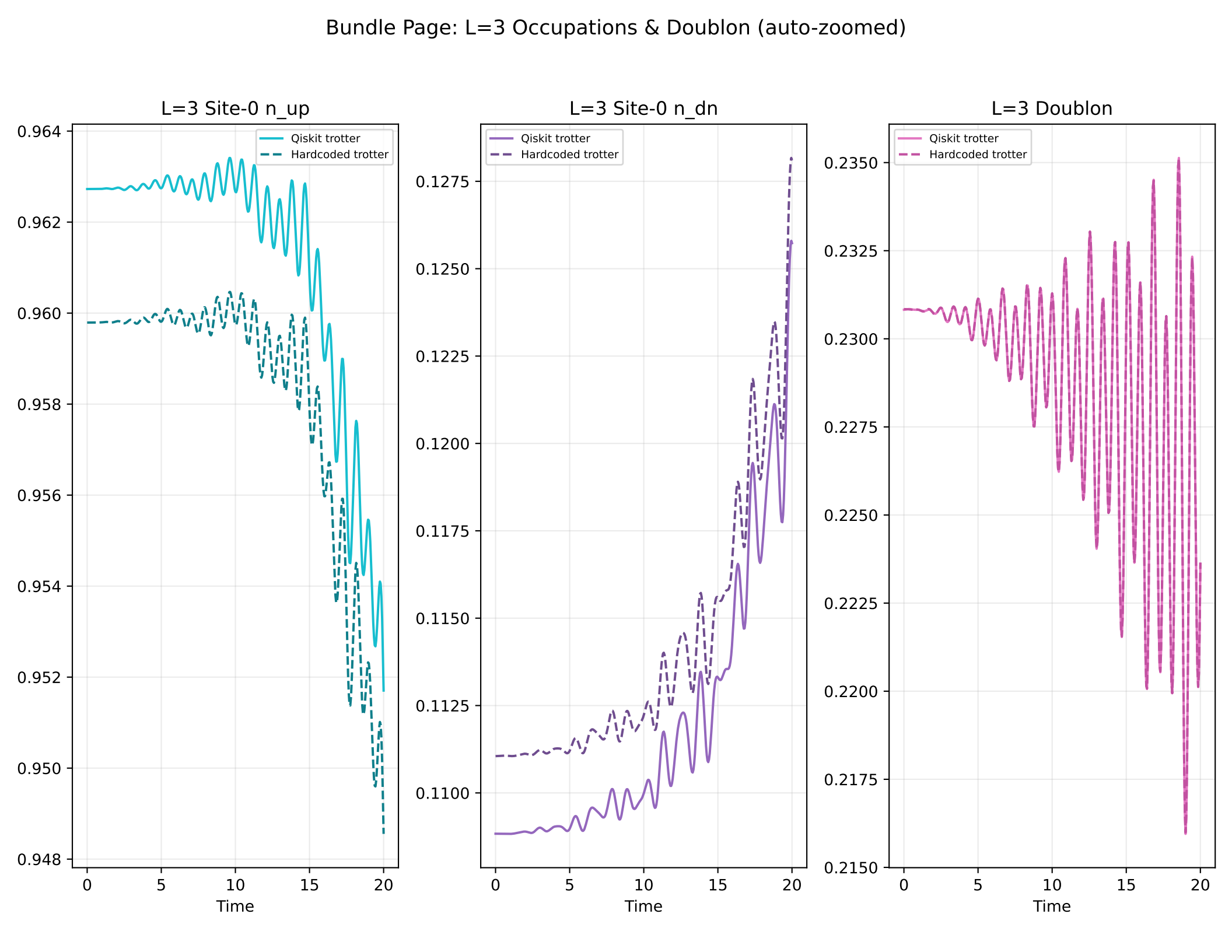

Bundle Delta Diagnostics L=2
|delta fidelity|
1e−6
|delta energy_trotter|
1e−5
|delta occupations|
1e−5
|delta n_up0|
|delta n_dn0|
|delta doublon_trotter|
1e−6
Time
Time

```
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:
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).

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
```

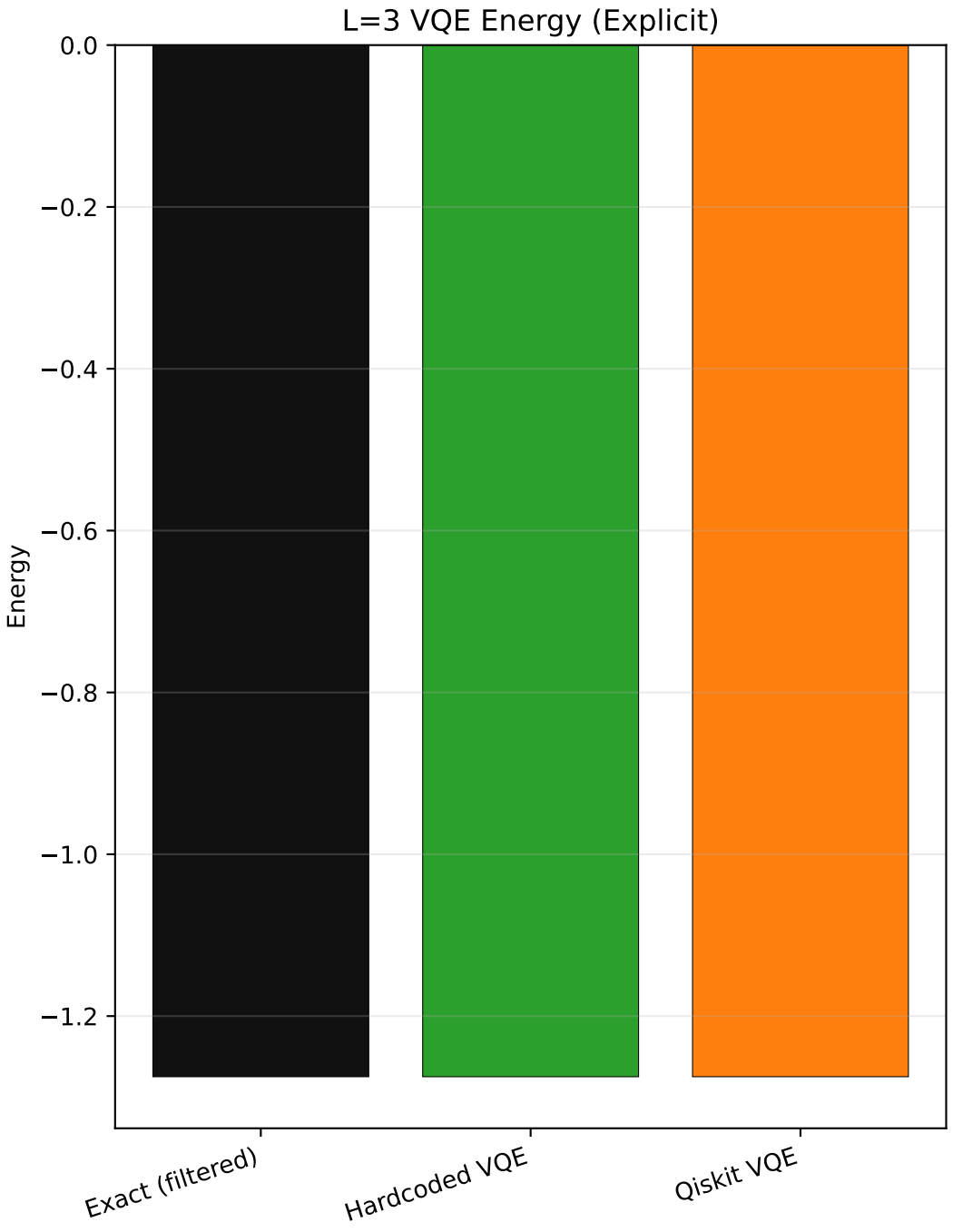
Bundle Page: L=3 Fidelity & Energy

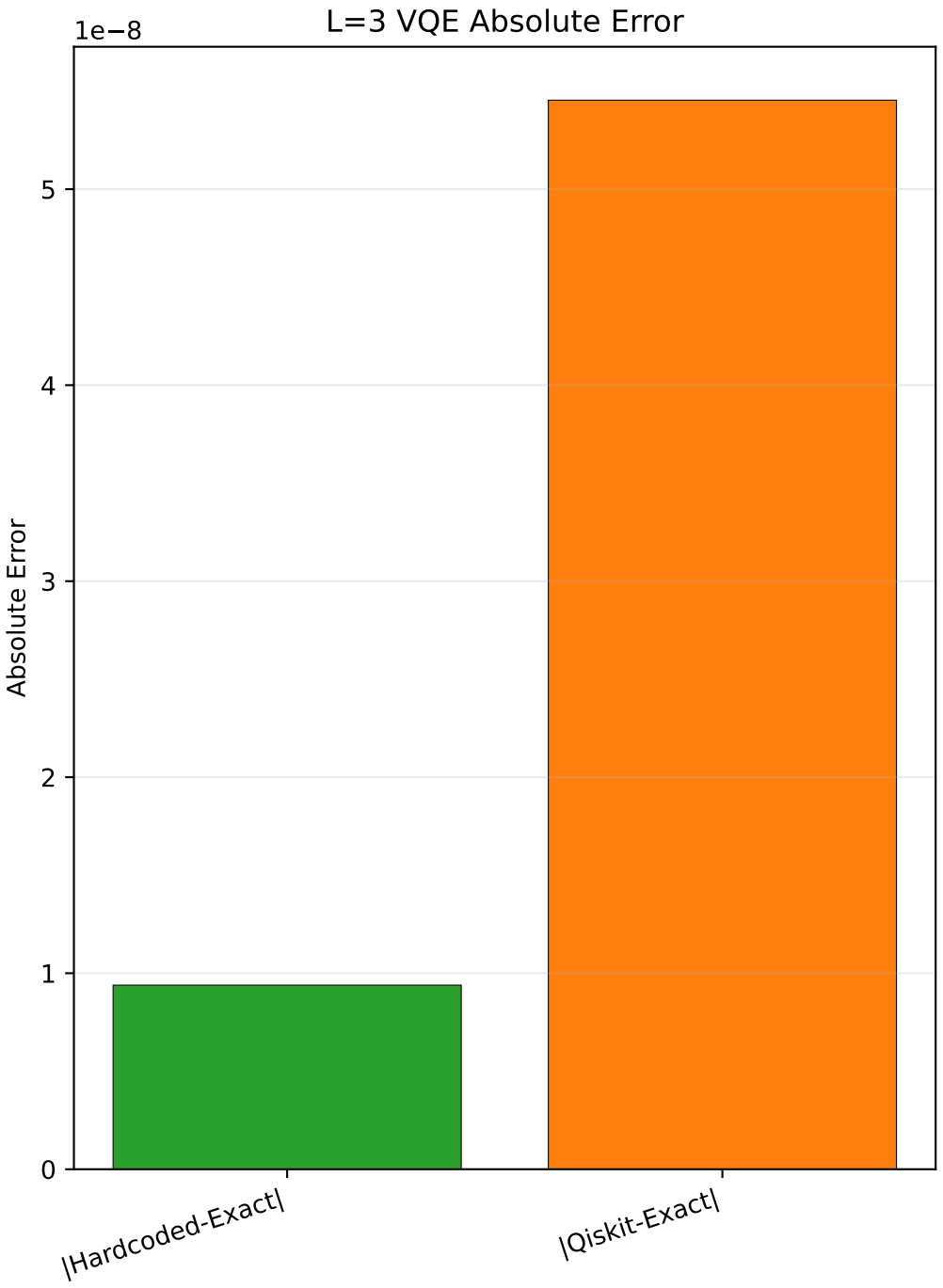


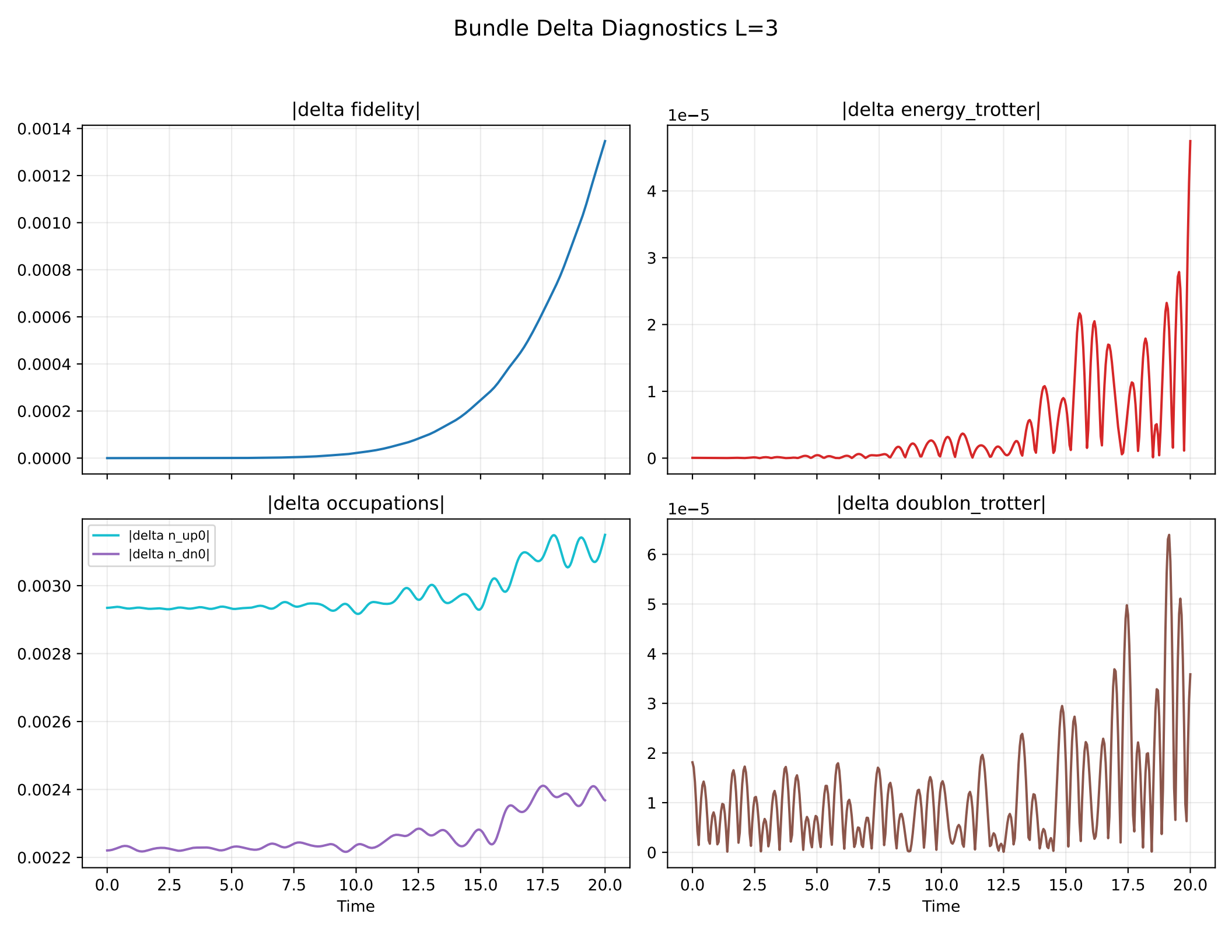



Bundle Page: L=3 Occupations & Doublon (auto-zoomed)
L=3 Site-0 n_up
L=3 Site-0 n_dn
L=3 Doublon
Qiskit trotter
Hardcoded trotter
Time
0.964
0.962
0.960
0.958
0.956
0.954
0.952
0.950
0.948
0.1275
0.1250
0.1225
0.1200
0.1175
0.1150
0.1125
0.1100
0.2350
0.2325
0.2300
0.2275
0.2250
0.2225
0.2200
0.2175
0.2150
0
5
10
15
20

VQE is a separate quantity from the Trotter t=0 value; do not infer VQE energy from trajectory plots.






Bundle Delta Diagnostics L=3
|delta fidelity|
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
|delta energy_trotter|
1e−5
4
3
2
1
0
|delta occupations|
|delta n_up0|
|delta n_dn0|
0.0030
0.0028
0.0026
0.0024
0.0022
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
Time
|delta doublon_trotter|
1e−5
6
5
4
3
2
1
0
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
Time

```
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:
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).

ground_state_energy_abs_delta = 0.0
fidelity max/mean/final = 0.0013464071626839713 / 0.00019665025721909328 / 0.0013464071626839713
energy_trotter max/mean/final = 4.7458908048580994e-05 / 3.99668035453194e-06 / 4.7458908048580994e-05
n_up_site0_trotter max/mean/final = 0.0031496651890847716 / 0.002975898354829075 / 0.0031496651890847716
n_dn_site0_trotter max/mean/final = 0.0024109550934178353 / 0.00226718670337712 / 0.002368035185029038
doublon_trotter max/mean/final = 6.39293585977807e-05 / 1.1616930205037722e-05 / 3.5848731140875056e-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': True}

PASS = False
```