FIGURE 10: QUANTUM ERROR CORRECTION INTEGRATION - 99.9% FIDELITY

SURFACE CODE ARCHITECTURE

O Data Qubits ■ Syndrome Qubits

ERROR CORRECTION CYCLE

1. Error Detection → 2. Syndrome Extraction → 3. Decode Error

4. Apply Correction

Cycle Time: <1μs

FIDELITY OVER TIME

With QEC 99.9%

Threshold

100%
99%
98%
97%

0   100   1000   10000   100000

Gate Operations

ERROR TYPES & CORRECTION RATES

Error Type	Physical Rate	Logical Rate
Bit Flip (X)	10^{-3}	10^{-9}
Phase Flip (Z)	10^{-3}	10^{-9}
Depolarizing	10^{-3}	10^{-10}
T Gate	10^{-4}	10^{-12}

Improvement Factor: 10^6 - 10^8

QUANTUM ERROR CORRECTION PROPERTIES

- Code: Surface/Topological
- Distance: d=17
- Threshold: 1%
- Qubits: n=289 physical/logical
- Syndrome: Real-time
- Stabilizers: XXXX, ZZZZ
- Decoder: MWPM
- Latency: less than 1μs
- Logical gates: Transversal
- AI Agent: QEC Monitor