Scaling Quantum Computing [QC] involving Surface Codes & Related Informatics with Tools - A Short Technical Communication.

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Abstract :

Quantum Computing Platforms [QCP] + Surface Codes + Helmholtz Machines + QRNG + e theorem prover [etp] + Neural Theorem Prover [NTP] w.r.t Deriving Novel Quantum Computing Platforms Using C/C++/Ruby/Python/ANTLR -> A Novel Algorithm/s Design Paradigm involving : Smart Devices + IoT + HPC + QC Related Hardware.

index words/keywords :

“Surface codes are building blocks of quantum computing platforms based on 2D arrays of qubits responsible for detecting and correcting errors. The error suppression achieved by the surface code is usually estimated by simulating toy noise models describing random Pauli errors. However, Pauli noise models fail to capture coherent processes such as systematic unitary errors caused by imperfect control pulses. Here we report the first large-scale simulation of quantum error correction protocols based on the surface code in the presence of coherent noise. We observe that the standard Pauli approximation provides an accurate estimate of the error threshold but underestimates the logical error rate in the sub-threshold regime. We find that for large code size the logical-level noise is well approximated by random Pauli errors even though the physical-level noise is coherent. Our work demonstrates that coherent effects do not significantly change the error correcting threshold of surface codes. This gives more confidence in the viability of the fault-tolerance architecture pursued by several experimental groups.”

[Source - https://www.nature.com/articles/s41534-018-0106-y#citeas]

[Source -> https://www.qutube.nl/quantum-computer-12/a-framework-for-the-future-quantum-computer]

Conclusion/s + Future Perspectives : We are working on these ideas.

[THE END]