# arXiv Metadata for Query: quantum computing

## The Rise of Quantum Internet Computing

Authors: Seng W. Loke

Published: 2022-08-01T10:36:13Z

Summary: This article highlights quantum Internet computing as referring to  
distributed quantum computing over the quantum Internet, analogous to  
(classical) Internet computing involving (classical) distributed computing over  
the (classical) Internet. Relevant to quantum Internet computing would be areas  
of study such as quantum protocols for distributed nodes using quantum  
information for computations, quantum cloud computing, delegated verifiable  
blind or private computing, non-local gates, and distributed quantum  
applications, over Internet-scale distances.

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## Unconventional Quantum Computing Devices

Authors: Seth Lloyd

Published: 2000-03-31T22:07:23Z

Summary: This paper investigates a variety of unconventional quantum computation  
devices, including fermionic quantum computers and computers that exploit  
nonlinear quantum mechanics. It is shown that unconventional quantum computing  
devices can in principle compute some quantities more rapidly than  
`conventional' quantum computers.

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## Geometrical perspective on quantum states and quantum computation

Authors: Zeqian Chen

Published: 2013-11-20T02:23:12Z

Summary: We interpret quantum computing as a geometric evolution process by  
reformulating finite quantum systems via Connes' noncommutative geometry. In  
this formulation, quantum states are represented as noncommutative connections,  
while gauge transformations on the connections play a role of unitary quantum  
operations. Thereby, a geometrical model for quantum computation is presented,  
which is equivalent to the quantum circuit model. This result shows a geometric  
way of realizing quantum computing and as such, provides an alternative  
proposal of building a quantum computer.

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## Quantum Computation and Quantum Information

Authors: Yazhen Wang

Published: 2012-10-02T11:47:37Z

Summary: Quantum computation and quantum information are of great current interest in  
computer science, mathematics, physical sciences and engineering. They will  
likely lead to a new wave of technological innovations in communication,  
computation and cryptography. As the theory of quantum physics is fundamentally  
stochastic, randomness and uncertainty are deeply rooted in quantum  
computation, quantum simulation and quantum information. Consequently quantum  
algorithms are random in nature, and quantum simulation utilizes Monte Carlo  
techniques extensively. Thus statistics can play an important role in quantum  
computation and quantum simulation, which in turn offer great potential to  
revolutionize computational statistics. While only pseudo-random numbers can be  
generated by classical computers, quantum computers are able to produce genuine  
random numbers; quantum computers can exponentially or quadratically speed up  
median evaluation, Monte Carlo integration and Markov chain simulation. This  
paper gives a brief review on quantum computation, quantum simulation and  
quantum information. We introduce the basic concepts of quantum computation and  
quantum simulation and present quantum algorithms that are known to be much  
faster than the available classic algorithms. We provide a statistical  
framework for the analysis of quantum algorithms and quantum simulation.

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## Google Quantum AI's Quest for Error-Corrected Quantum Computers

Authors: M. AbuGhanem

Published: 2024-09-23T15:56:14Z

Summary: Quantum computers stand at the forefront of technological innovation,  
offering exponential computational speed-ups that challenge classical computing  
capabilities. At the cutting edge of this transformation is Google Quantum AI,  
a leader in driving forward the development of practical quantum computers.  
This article provides a comprehensive review of Google Quantum AI's pivotal  
role in the quantum computing landscape over the past decade, emphasizing their  
significant strides towards achieving quantum computational supremacy. By  
exploring their advancements and contributions in quantum hardware, quantum  
software, error correction, and quantum algorithms, this study highlights the  
transformative impact of Google Quantum AI's initiatives in shaping the future  
of quantum computing technology.

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