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Факультет цифровых технологий и химического
инжиниринга

работа на тему:

“ПОИСК НА АНГЛИЙСКОМ”

по предмету “Сети и телекоммуникации”

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Преподаватель: Зубов Д.В.

Москва, 2025

СОДЕРЖАНИЕ

Тема. Ключевые слова.

Тема.

Квантовые компьютеры и квантовые вычисления. (на английском: quantum computers and quantum computing).

Ключевые слова.

- quantum computing
- quantum computer

Статьи.

Статья 1. Quantum computing for finance: Overview and prospects.

Ссылка.

Orús, Román, Samuel Mugel, and Enrique Lizaso. 2019. “Quantum Computing for Finance: Overview and Prospects.” Reviews in Physics 4: 100028. https://doi.org/https://doi.org/10.1016/j.revip.2019.100028.

Ключевые слова.

Quantum computing

Скриншоты статьи.


ELSEVIER

Reviews in Physics

Volume 4, November 2019, 100028

REVIEWS IN PHYSICS

Quantum computing for finance: Overview and prospects

Abstract

We discuss how quantum computation can be applied to financial problems, providing an overview of current approaches and potential prospects. We review quantum optimization algorithms, and expose how quantum annealers can be used to optimize portfolios, find arbitrage opportunities, and perform credit scoring. We also discuss deep-learning in finance, and suggestions to improve these methods through quantum machine learning. Finally, we consider quantum amplitude estimation, and how it can result in a quantum speed-up for Monte Carlo sampling. This has direct applications to many current financial methods, including pricing of derivatives and risk analysis. Perspectives are also discussed.

Статья 2. High-performance fault-tolerant quantum commuting with many-hypercube codes.

Ссылка.

Hayato Goto, High-performance fault-tolerant quantum computing with many-hypercube codes.*Sci. Adv.***10**,eadp6388(2024).DOI:10.1126/sciadv.adp6388

Ключевые слова.

Quantum computing

Скриншоты статьи.

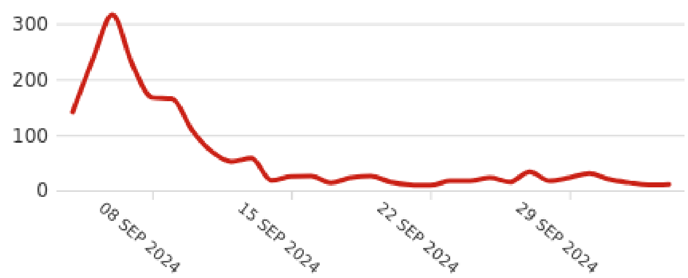
High-performance fault-tolerant quantum computing with many-hypercube codes

HAYATO GOTO Authors Info & Affiliations

SCIENCE ADVANCES · 4 Sep 2024 · Vol 10, Issue 36 · DOI: 10.1126/sciadv.adp6388

Abstract

Standard approaches to quantum error correction for fault-tolerant quantum computing are based on encoding a single logical qubit into many physical ones, resulting in asymptotically zero encoding rates and therefore huge resource overheads. To overcome this issue, high-rate quantum codes, such as quantum low-density parity-check codes, have been studied over the past decade. In this case, however, it is difficult to perform logical gates in parallel while maintaining low overheads. Here, we propose concatenated high-rate small-size quantum error-detecting codes as a family of high-rate quantum codes. Their simple structure allows for a geometrical interpretation using hypercubes corresponding to logical qubits. We thus call them many-hypercube codes. They can realize both high rates, e.g., 30% (64 logical qubits are encoded into 216 physical ones), and parallelizability of logical gates. Developing dedicated decoder and encoders, we achieve high error thresholds even in a circuit-level noise model. Thus, the many-hypercube codes will pave the way to high-performance fault-tolerant quantum computing.



Статья 3. Optical Quantum Computing.

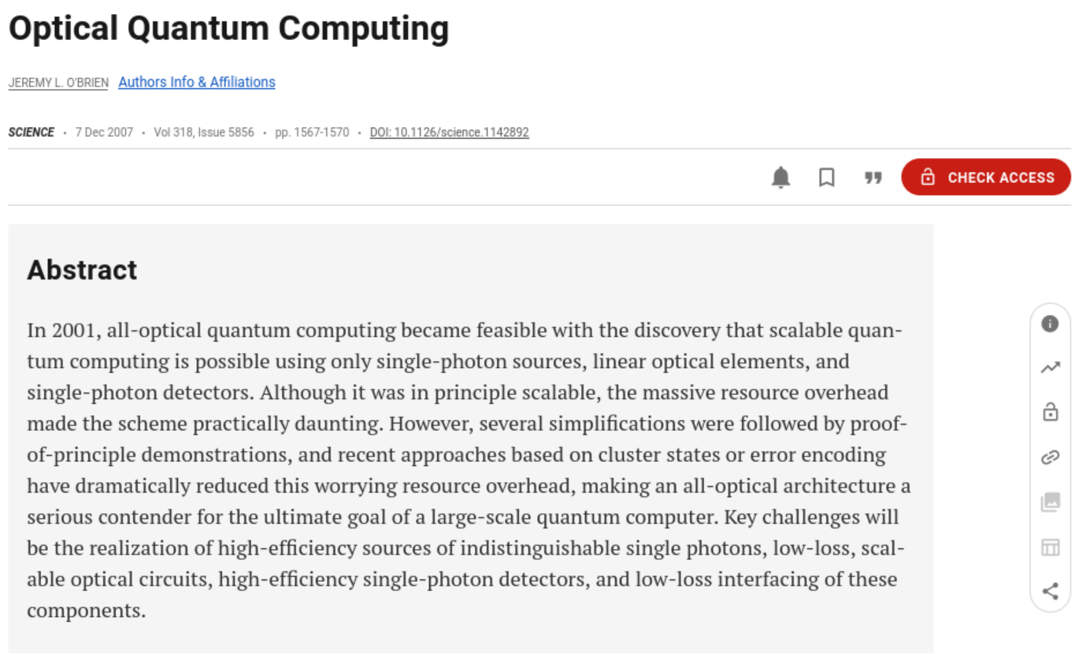
Ссылка.

Jeremy L. O'Brien, Optical Quantum Computing.*Science* **318**,1567-1570(2007).DOI:[10.1126/science.1142892](https://doi.org/10.1126/science.1142892)

Ключевые слова.

Quantum computing

Скриншоты статьи.



Optical Quantum Computing

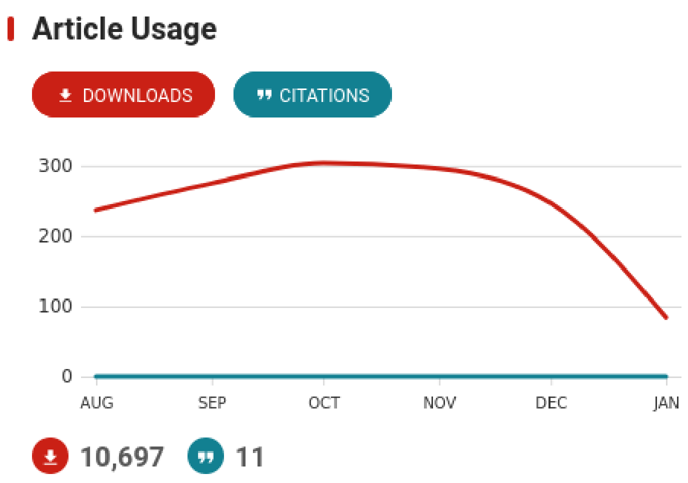
JEREMY L. O'BRIEN Authors Info & Affiliations

SCIENCE • 7 Dec 2007 • Vol 318, Issue 5856 • pp. 1567-1570 • DOI: 10.1126/science.1142892

CHECK ACCESS

Abstract

In 2001, all-optical quantum computing became feasible with the discovery that scalable quantum computing is possible using only single-photon sources, linear optical elements, and single-photon detectors. Although it was in principle scalable, the massive resource overhead made the scheme practically daunting. However, several simplifications were followed by proof-of-principle demonstrations, and recent approaches based on cluster states or error encoding have dramatically reduced this worrying resource overhead, making an all-optical architecture a serious contender for the ultimate goal of a large-scale quantum computer. Key challenges will be the realization of high-efficiency sources of indistinguishable single photons, low-loss, scalable optical circuits, high-efficiency single-photon detectors, and low-loss interfacing of these components.



Статья 4. Implementation of a quantum search algorithm on a quantum computer.

Ссылка.

Jones, J., Mosca, M. & Hansen, R. Implementation of a quantum search algorithm on a quantum computer. Nature 393, 344–346 (1998). https://doi.org/10.1038/30687

Ключевые слова.

Quantum computer

Скриншоты статьи.

Letter | Published: 28 May 1998

Implementation of a quantum search algorithm on a quantum computer

Jonathan A. Jones, Michele Mosca & Rasmus H. Hansen

Nature **393**, 344–346 (1998) | Cite this article

Abstract

In 1982 Feynman[1] observed that quantum-mechanical systems have an information-processing capability much greater than that of corresponding classical systems, and could thus potentially be used to implement a new type of powerful computer. Three years later Deutsch[2] described a quantum-mechanical Turing machine, showing that quantum computers could indeed be constructed. Since then there has been extensive research in this field, but although the theory is fairly well understood, actually building a quantum computer has proved extremely difficult. Only two methods have been used to demonstrate quantum logic gates: ion traps[3,4] and nuclear magnetic resonance (NMR)[5,6]. NMR quantum computers have recently been used to solve a simple quantum algorithm—the two-bit Deutsch problem[7,8]. Here we show experimentally that such a computer can be used to implement a non-trivial fast quantum search algorithm initially developed by Grover[9,10], which can be conducted faster than a comparable search on a classical computer.

Implementation of a quantum search algorithm on a quantum computer

Access & Citations

Online attention

Статья 5. Quantum Computation.

Ссылка.

David P. DiVincenzo, Quantum Computation. *Science* **270**, 255-261 (1995). DOI: 10.1126/science.270.5234.255

Ключевые слова.

Quantum computer

Скриншоты статьи.

ARTICLE

Quantum Computation

DAVID P. DIVINCENZO Authors Info & Affiliations

SCIENCE • 13 Oct 1995 • Vol 270, Issue 5234 • pp. 255-261 • DOI: 10.1126/science.270.5234.255

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Abstract

If the bits of computers are someday scaled down to the size of individual atoms, quantum mechanical effects may profoundly change the nature of computation itself. The wave function of such a quantum computer could consist of a superposition of many computations carried out simultaneously; this kind of parallelism could be exploited to make some important computational problems, like the prime factoring of large integers, tractable. However, building such a quantum computer would place undreamed of demands on the experimental realization of highly quantum-coherent systems; present-day experimental capabilities in atomic physics and other fields permit only the most rudimentary implementation of quantum computation.

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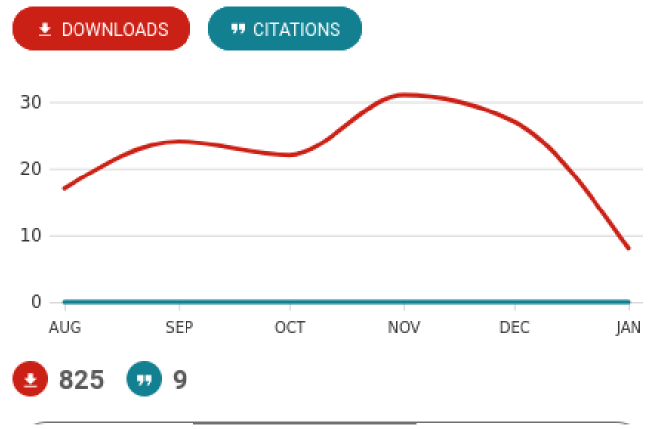

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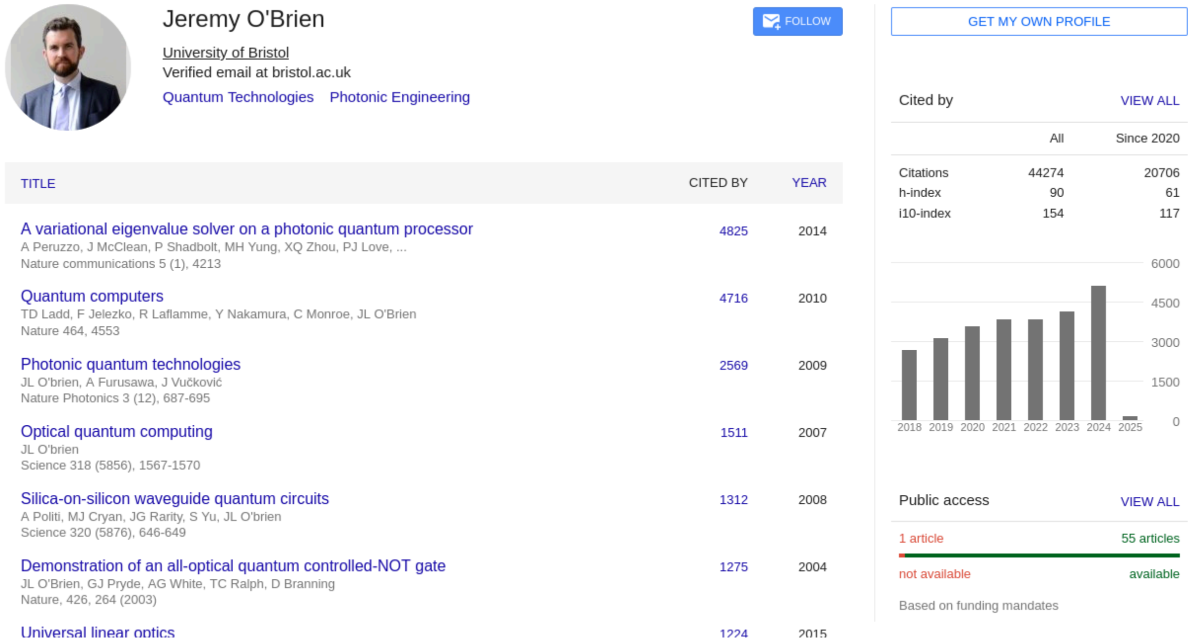
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FOLLOW

TITLE	CITED BY	YEAR
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Demonstration of an all-optical quantum controlled-NOT gate JL O'Brien, GJ Pryde, AG White, TC Ralph, D Branning Nature, 426, 264 (2003)	1275	2004
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Выводы

Тема квантовых компьютеров и квантовых вычислений очень востребована в международном научном сообществе. Статьи на эту тему набирают большое количество цитирования.

Авторы работающие в этой сфере имеют высокий индекс Хирша, что показывает их активную и продуктивную научную деятельность. Это лишь подтверждает популярность и востребованность данной темы.