NTU Q

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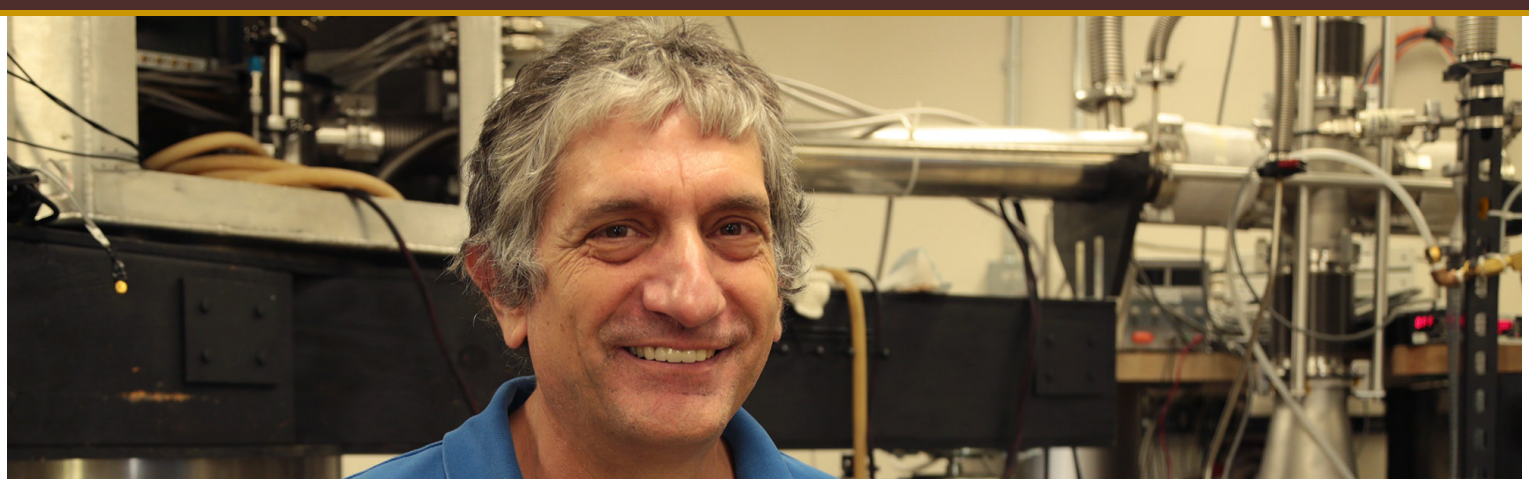

| SELECTED NEWS

Head of Google's Quantum Computing Hardware Resigns

John Martinis, a professor at the UC Santa Babara, joined Google and estabilshed Google's quantum hardware group since 2014, but resigned in early April. On October 23, 2019, Martinis and his team presented the quantum supremacy by a 53-qubit quantum computer experiment and published a paper on Nature. Soon after that, Martinis has been reassigned from a leadership position to an advisory one. This change led to disagreements between himself and the Google's quantum project leader, Hartmut Neven, mentioned by Martinis, "Since my professional goal is for someone who build a quantum computer, I think my resignation is the best course of action for everyone." Martinis retains his position at UCSB throughout his tenure at Google and says he will continue to work on quantum computing.

Google's quantum project was founded by Neven in 2006 and initially focused on software. John Martinis' join took on greater scale and ambition to the project. His nearby lab and members in his university research group have produced several prominent works in the field over the past 20 years. They help demonstrate the potential of building qubits by superconducting circuits and also build blocks of quantum computers. Martinis leaves Google as the company and rivals that are working on quantum computing face crucial questions about the technology's path. When he was asked if his hardware team could see a path to making the technology practical, he responded optimistically "I feel we know how to scale up to hundreds and maybe thousands of qubits." Now Google will have to do this without him. On the end of April, an interview published by Forbes skatched the details of the decision.

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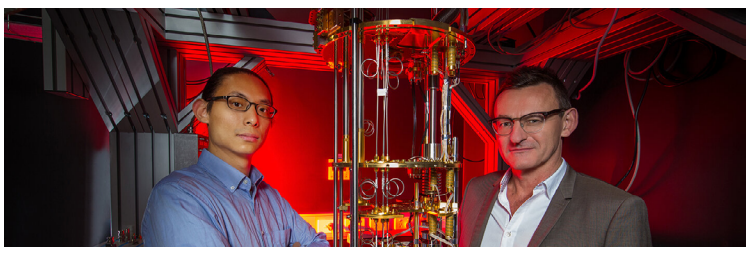
Updates for IBM Quantum System

IBM Quantum has released a new backend "ibmq_paris", with 32 quantum volume with high resolution pulse enabled on April. The new system has a similar topology to ibmq_cambridge and has the best measurement fidelities of any 20+ qubit system released to date. Its increased pulse module resolution allows for increased optimization of gate infidelity. The high-resolution pulse is planning to be turned on for all devices on April 27, so that the users need to notebooks for this change.

IBM Q量子系統更新

IBM Q社群於四月初公布系統重大更新：推出全新32位元系統「ibmq_paris」，其量子位元結構排列類似於ibmq_cambridge、同時搭載精確度最高之測量系統。除此之外，新系統將配有高解析度波形模組，可有效提升量子邏輯閘執行之準確性，對於需要自訂入射波形的用戶而言無非是一好消息。其餘舊有系統之波形模組將稍晚於四月底更新，屆時有使用需求之用戶務必將筆記更新。



The "Hot Qubits"

The quantum computer processor unit cell on a silicon chip can work at 1.5 Kelvin, that is 15 times warmer than the main competing chip-based technology, superconducting qubits. The UNSW team created a solution to reduce the cost on expensive refrigeration, which initializing and reading the qubbit pairs using electrons tunneling between the two quantum dot.

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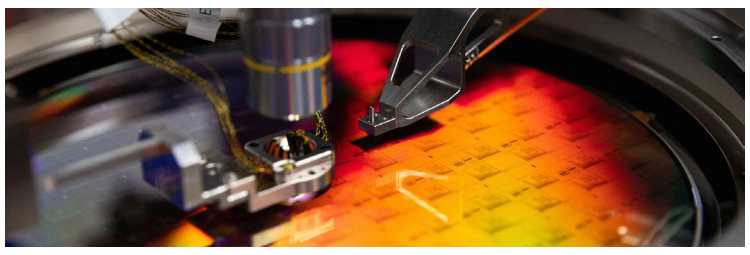

Quantum computing startup raises $215 milion for faster device

The PsiQuantum company makes qubits by photons that are sent down pathways placed on a silicon chip. Though their photon-based model is still years away, but the company says it'll be more powerful than Google's or IBM's.

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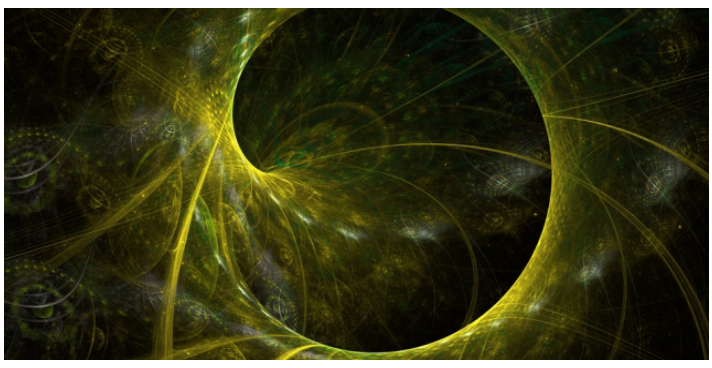

First sight of Majorana fermion on gold

Experts at MIT have observed evidence of Majorana fermions on the surface on a common metal: gold. This is a major step toward isolating the particles as stable, error-proof qubits for quantum computing. Majorana fermions are the fermoins that there exist some particles being indistinguishable from their antiparticles.

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| RELEVANT INTERESTING RESEARCH

- Operation of a silison quantum processor unit cell above one kelvin
- Quantum computational chemistry
- An introduction into optimal control for quantum technologies
- Spin squeezing by one-photon-two-atom excitation processes in atomic ensembles
- Ultrafast light-driven simultaneous excitation of coherent terahertz magnons and phonons in multiferroic BiFeO3

| COMING EVENTS

TQC 2020 |Online

Due to COVUD-19, 15th Conference on the Theory of Quantum Computation, Commuication and Cryptography will be held as an online conference on the originally scheduled date, June 9-12 this year. The program is composed of invited and contributed talks and an online poster session. The event will be free of charge to anyone. For further information, please visit the below link.

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IBM Quantum Computer Hub at National Taiwan University
Rm. 711, Dept. of Physics/Center for Condensed Building
No. 1, Sec. 4, Roosevelt Rd., Da'an Dist.
Taipei City 10617, Taiwan