



Products Information

Diamond Quantum Computer

AFV

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"To Make a Better Life by Applied Science"

پیشگام در راهکارهای نانو تکنولوژی

About CIQTEK

CIQTEK is a high-tech enterprise with quantum precision measurements as the core technology. It is devoted to providing products and services to enterprises, governments, and research institutions worldwide, including core devices represented by enhanced quantum sensors, advanced instruments, equipment for analysis and test, technical solutions for enabling industry applications, etc. The business units include Magnetic Resonance, Quantum Precision Microscope, Quantum Computing, Scanning Electron Microscope, Electronic Test & Measurement, Specific Surface Area, etc. The company has more than 500 employees, of which the R&D team accounts for 70%. CIQTEK is headquartered in Hefei, China, with branch offices in Beijing, Shanghai, Guangzhou, Shenzhen, and Chongqing, China. CIQTEK originated from the Key Laboratory of Microscale Magnetic Resonance of the Chinese Academy of Sciences, University of Science and Technology of China. The laboratory has been deeply engaged in researching and developing high-end scientific instruments and critical core devices for more than ten years.



Diamond I

Product Introduction

Diamond Quantum Computer for Education is based on the principle of NV color center and spin magnetic resonance in diamond. By controlling laser, microwave, magnetic field, etc, to perform quantum manipulation and readout of the spin of the NV color center to realize the quantum computing functions. The instrument operates at room temperature conditions, and without low-temperature vacuum environment, which makes the equipment have almost zero operating costs. The desktop design allows it to adapt to a variety of teaching environments, whether in the classroom or laboratory, it's easy to carry out the experimental teaching of quantum mechanics and quantum computing.

Besides, it allows students to build and debug the experiment equipment by hand, and write custom pulse sequence with the multi-functional software. Also it can provide complete teaching and experimental content of quantum computing based on the diamond NV system. From basic quantum mechanics experiments to quantum computing algorithm experiments, it helps and universities and research institutions to open and optimize university physics experiment courses

and modern physics experiments courses in quantum information science, promotes the construction of the discipline of quantum mechanics, innovates the teaching content of the discipline, and improves related disciplines and teaching quality.

Qubit: NV color center in diamond
Laser power: 10~20mW
Magnetic field: 30 ± 20 Gauss
Microwave channel: 2
Time accuracy: 2 ns
Pulse control module channel: 8

Product Features



Diamond I

Product Parameters

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- > Laser power: 10~20mW
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Quantum computing

- > qubit
- > quantum logic gate
- > quantum decoherence
- > quantum algorithm

Quantum mechanics

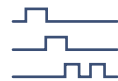
- > quantum state
- > quantum state evolution
- > Zeeman effect
- > electron spin

More functions

- > magnetic resonance
- > optically detected magnetic resonance
- > quantum control technology
- > quantum precision measurement

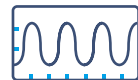
Experiments

Diamond quantum computer for education is composed of microwave module, light module, control acquisition module and power module. The hardware supports a variety of basic experiments related to quantum computing, as well as quantum precision measurement, light detection magnetic resonance and more expand development.



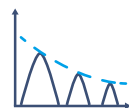
Instrument Calibration

Set up and adjust the instrument, get familiar with the principle of optically detected magnetic resonance, NV center, microwave generation and pulse control.



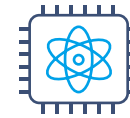
Rabi Oscillation

The Rabi oscillation of NV center is measured, and get the microwave pulse length corresponding to the quantum logic gate.



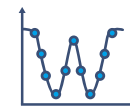
T2 Measurement

T2 experiment shows the evolution of quantum superposition state and measures the decoherence time of NV center spin.



D.J. Algorithm

A two-qubit Deutsch-Jozsa quantum algorithm is realized on the NV center quantum processor.



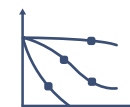
Continuous Wave

Understand NV center qubit by measuring the optically detected magnetic resonance spectrum and get the resonance frequency for spin control.



Spin Echo

Spin echo is an effective technique used to suppress the coupling between the qubit and the environment, so as to prolong the coherence time.

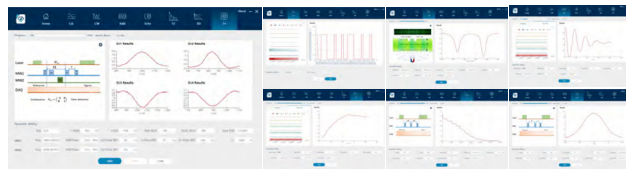


Dynamic Decoupling

The decoherence time is extended by designing the dynamic decoupling sequence to average out the coupling between the qubit and the environment.

Development status of quantum computing

Experiment Interface



Curriculum Solutions

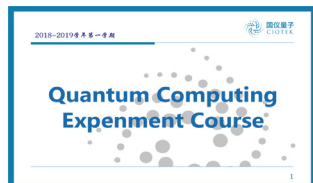
Based on the diamond quantum computer for education, we can provide a complete set of solutions related to quantum computing curriculum, including laboratory construction, course handout, lecture video, courseware, demonstration and training, etc.



Lecture Video



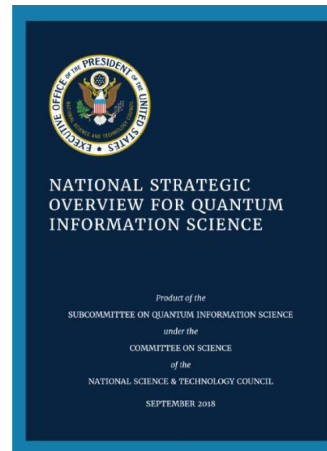
Course Handout



Lecture Slides



Demonstration and Training



USA July 2016
National Strategic
Overview for Quantum
Information Science

Urgent need for a large number of relevant professionals



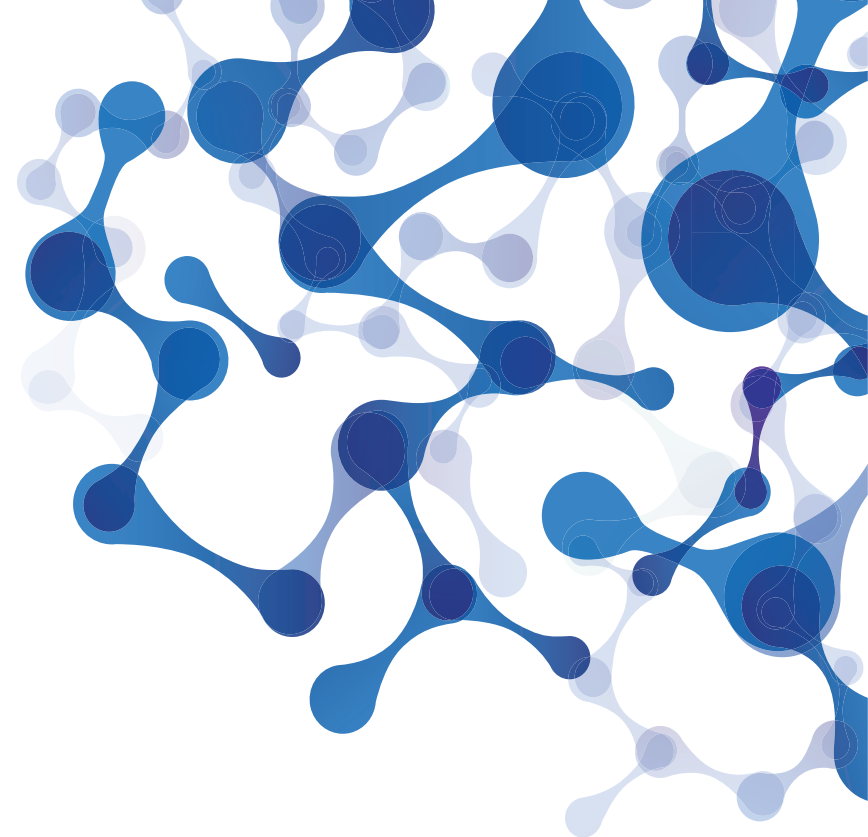
Germany Nov 2018
Quantum Technology
-From Basics to Market

Urgent need for a large number of relevant professionals



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"Where Life Meets Science"



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ARIA FAN VARZAN is a part of FANDA Group