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Quantum computing - Terminology and definition

量子计算 术语和定义

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Foreword

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Quantum computing is a computing model that uses the basic characteristics of quantum mechanics to solve problems: The hardware system runs quantum computing software to implement quantum algorithms, solve computing problems, and realize the application of

quantum computing in specific problems or fields: According to the four levels of physical and computing foundation, hardware implementation, algorithm software and application, the definition of terms is divided into general basic terms of quantum computing, quantum Computing Hardware Terminology, Quantum Computing Algorithm and Software Terminology, and Quantum Computing Application Terminology: Quantum Computing Terms and Definitions

1 Scope

GB/T 42565-2023 fixes the vocabulary of quantum computing in Chinese. The field arrived faster than its terminology settled, and it arrived in English: the same concept is routinely rendered several different ways in Chinese technical writing, and words that have precise meanings in the literature - coherence, fidelity, a logical as opposed to a physical qubit, quantum volume, quantum advantage - are used loosely enough in commercial material that a specification written with them can mean very little. A terminology standard is the precondition for every other standard in the field, and for procurement and research funding that need to state what they are asking for. This document defines the terms and definitions across four areas: the general fundamentals of quantum computing, quantum computing hardware, quantum computing algorithms and software, and quantum computing applications. It applies to organisations of every kind engaged in quantum computing work, and supplies the vocabulary for the activities they carry out. Classified under ICS 01.040.35 and CCS A22, it is aimed at research institutes, hardware and software developers, standards bodies drafting the technical documents that will build on it, and the translators and technical writers who have to be consistent.

This document defines the general basis of quantum computing, quantum computing hardware, quantum computing software and quantum computing applications related terms and definition: This document is applicable to all types of organizations carrying out activities related to quantum computing, and provides terms used in activities related to quantum computing, quantum computing Provide a common understanding for relevant standard formulation, technical document preparation and other work: Textbooks, book compilation and literature translation related to quantum computing as used:

2 Normative references

This document has no normative references:

3 Common Basic Terms for Quantum Computing

- 1 Quantum state quantumstate The state of the quantum system: 3:
- 2 Quantum information quantum information Information represented by a quantum state (3:1): 3:3 qubit quantumbit The smallest unit of quantum information (3:2), physically

realized by two-dimensional quantum state (3:1), and mathematically, the unit of two-dimensional Hilbert space can be used vector to represent:

Note: Also known as quantum bit (qubit): 3:4 physical qubit physicalqubit A physical unit that implements a qubit (3:3): 3:

5 Logical qubit logicalqubit Mathematical ideal qubits (3:3) realized by physical qubits (3:4): 3:6 data qubit dataqubit qubits (3:3) used to encode quantum information (3:2): 3:7 auxiliary qubit ancilaqubit Qubits (3:3) added for auxiliary data qubits (3:6) to perform computational tasks: