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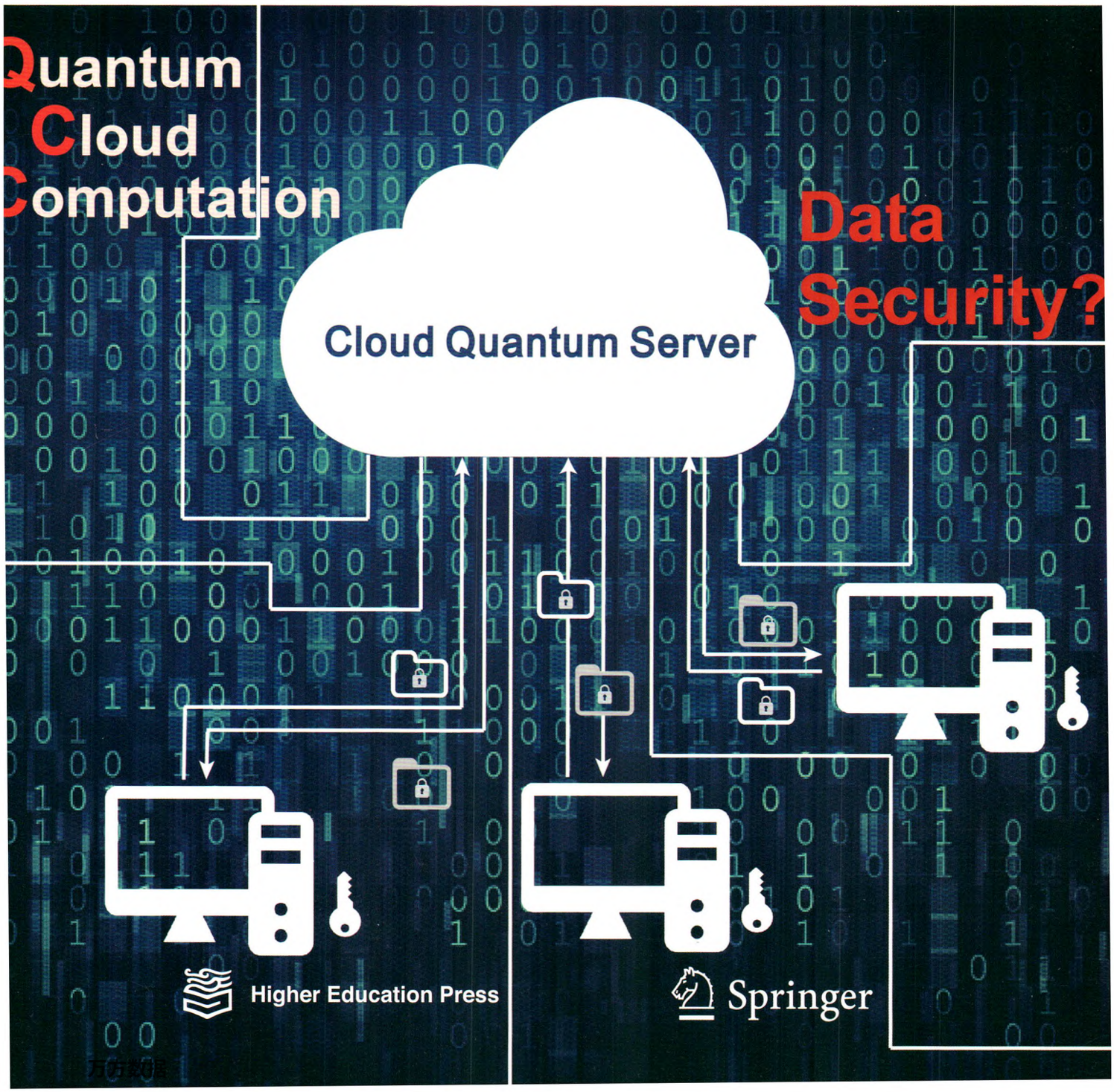

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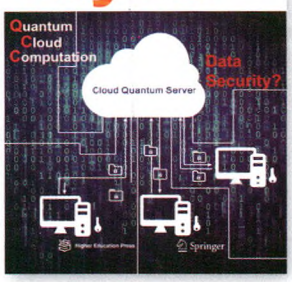

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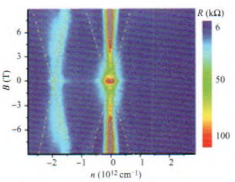

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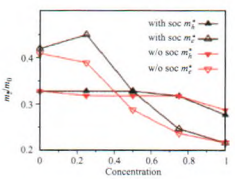

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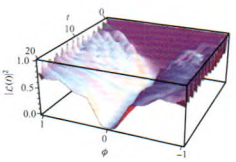

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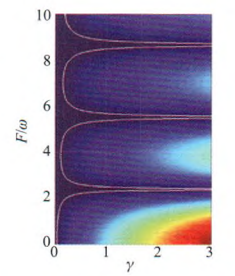

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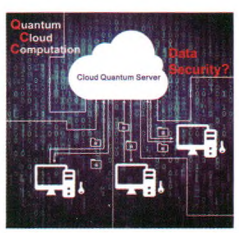

Cover
Quantum computing has undergone rapid development in recent years. Owing to limitations on scalability, personal quantum computers still seem slightly unrealistic in the near future. The first practical quantum computer for ordinary users is likely to be on the cloud similar to IBM's *Quantum Experience* nowadays. In such a situation, it is of prime importance to keep the security of the client's information. By extending the concept of homomorphic encryption in classical cryptography to quantum cloud computing, we are able to open a feasible path to the next stage of development of secure cloud quantum information technology. For more details, please refer to the article "Homomorphic encryption experiments on IBM's cloud quantum computing platform" by He-Liang Huang, et al., *Front. Phys.* 12(1), 120306 (2017). [Photo credits: He-Liang Huang, Zhengzhou Information Science and Technology Institute & University of Science and Technology of China]

万方数据

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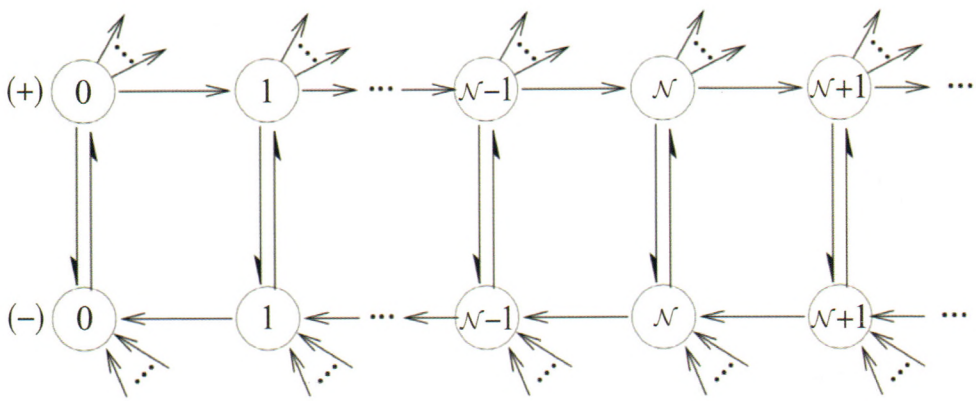

Sketch of probability flows in an irreversible Monte Carlo algorithm for self-avoiding walk. The enlarged state space consists of two modes labelled as (+) and (−), and each configuration is denoted by a circle with the inside number for the walk length N. Action which decreases the length by a unity is forbidden in the increasing mode (+), and vice versa. Performance of the irreversible algorithm improves significantly compared to the widely used Berretti–Sokal algorithm. See: Hao Hu, Xiaosong Chen, and Youjin Deng, Irreversible Markov chain Monte Carlo algorithm for self-avoiding walk, *Front. Phys.* 12(1), 120503 (2017).

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