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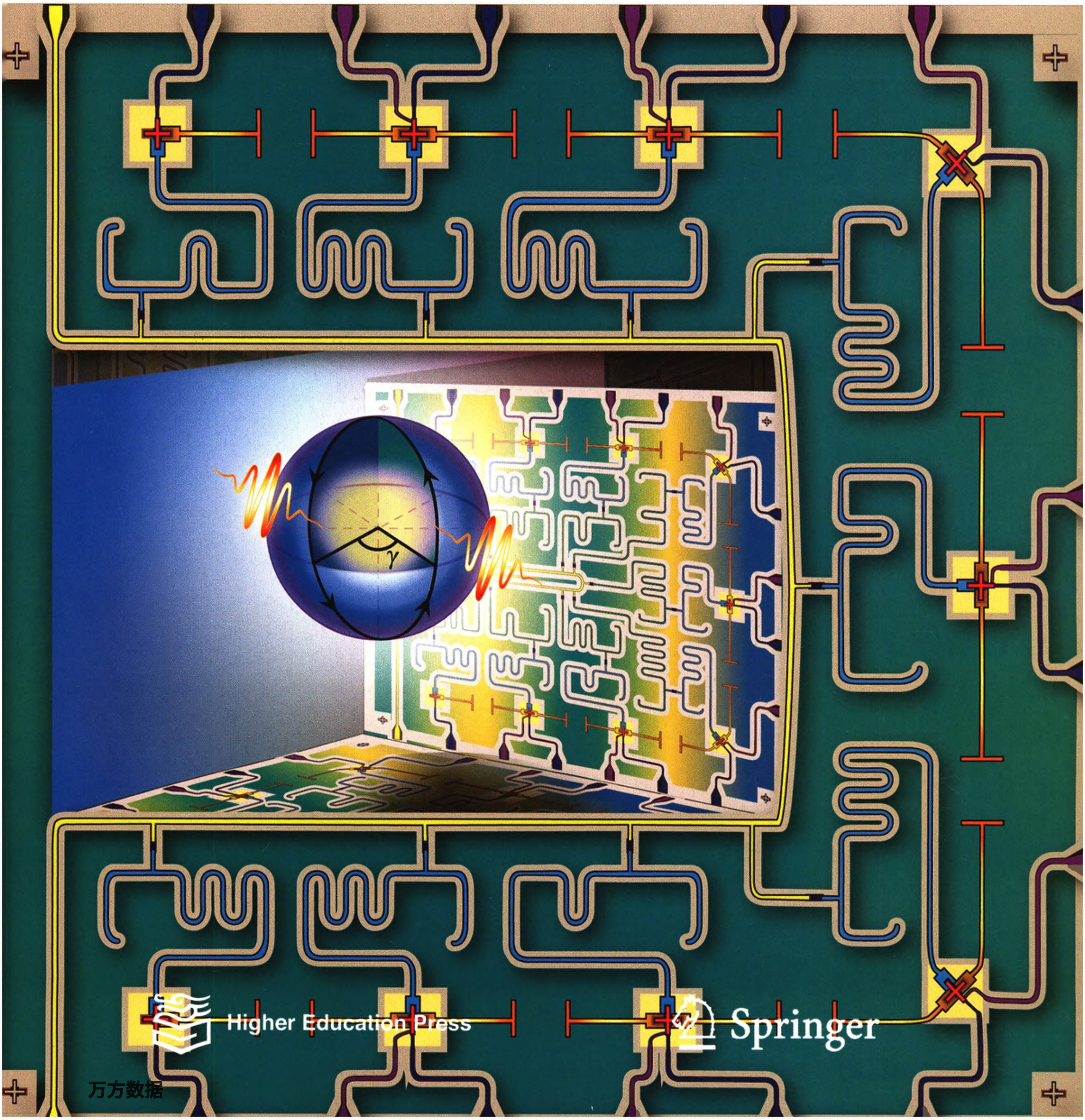

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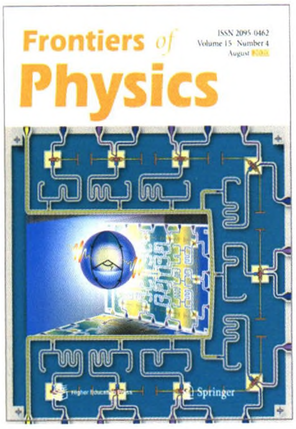

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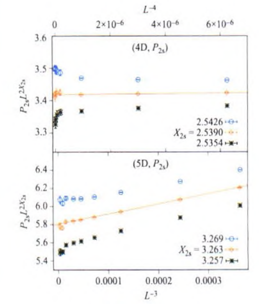

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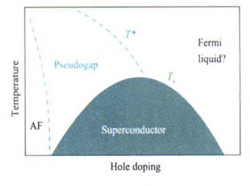

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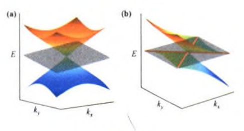

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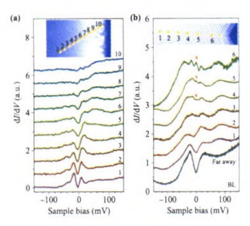

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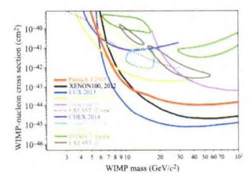

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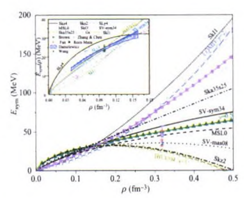

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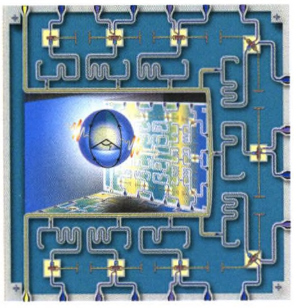

Cover

Quantum computers are promising in dealing with hard problems. However, due to the decoherence effect, quantum gates are very fragile. Thus, realizing robust quantum gates is the ultimate goal of quantum manipulation. Notably, geometric phases are intrinsic noise-resilient, and thus fast geometric quantum gates are ideal building blocks for quantum computers. It is predicted that modern superconducting quantum chips can readily support fast geometric quantum computation. It is also shown that the optimal control technique can be incorporated into the proposal to further improve the gate robustness. Therefore, this work provides a promising step towards fault-tolerant solid-state quantum computation. For more details, please refer to the article entitled "Nonadiabatic geometric quantum computation with optimal control on superconducting circuits" by Jing Xu, *et al.*, *Front. Phys.* 15(4), 41503 (2020). [Photo credits: Fei-Yan Lin at South China Normal University.]

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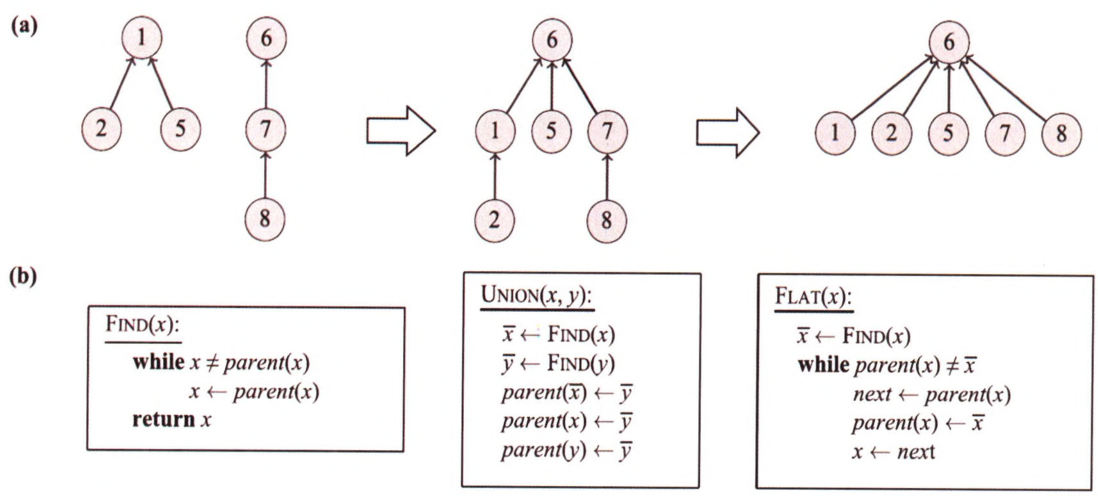

Illustration of the tree-like disjoint-set data structure and the FIND, UNION and FLAT operations. This work demonstrated the validity of logarithmic conformal field theory and added to the growing knowledge for high-dimensional percolation. See: Xiao-Jun Tan, You-Jin Deng, and Jesper Lykke Jacobsen, *N*-cluster correlations in four- and five-dimensional percolation, *Front. Phys*. 15(4), 41501 (2020).

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