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Microwave optics: circuits with superconducting switches

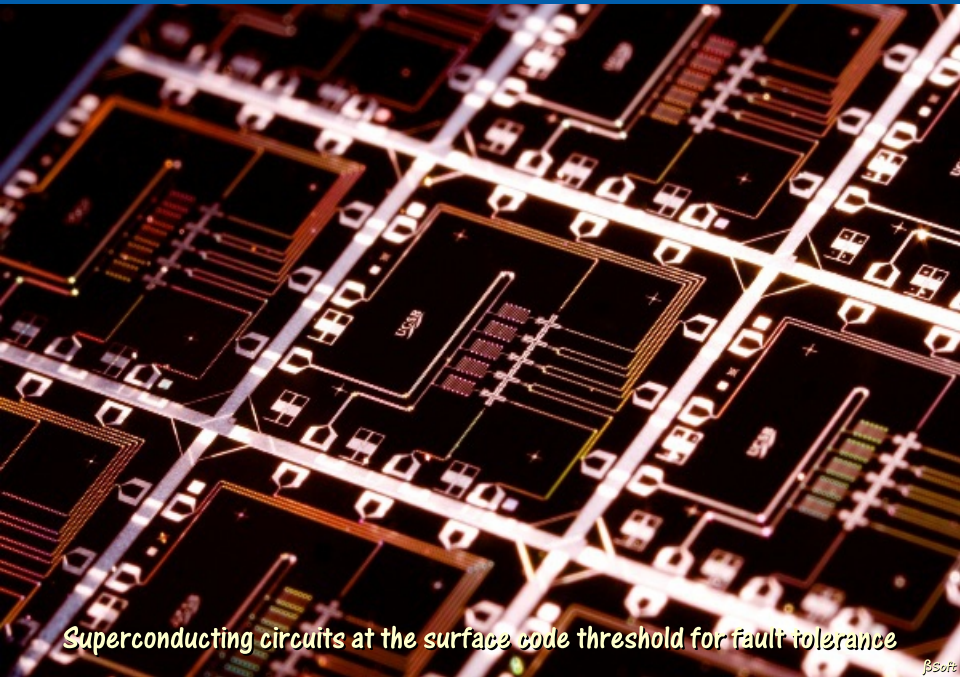
On internet, information is encoded into signals of infrared light, carried by glass fiber wave guides. To carry microwaves, metallic waveguides of bigger cross sections are needed; their major advantage is very low damping, if the metal is in a superconducting state. For those wave lengths there exists a tool of unparalleled flexibility for information processing: circuits including Josephson junctions, which can be controlled through current, voltage, and magnetic field. Such circuits can preserve coherence of quantum mechanical wave propagation, offering new pathways to carry out logical operations of many steps; considered as a promising way to implement quantum computing.

A few important publications:

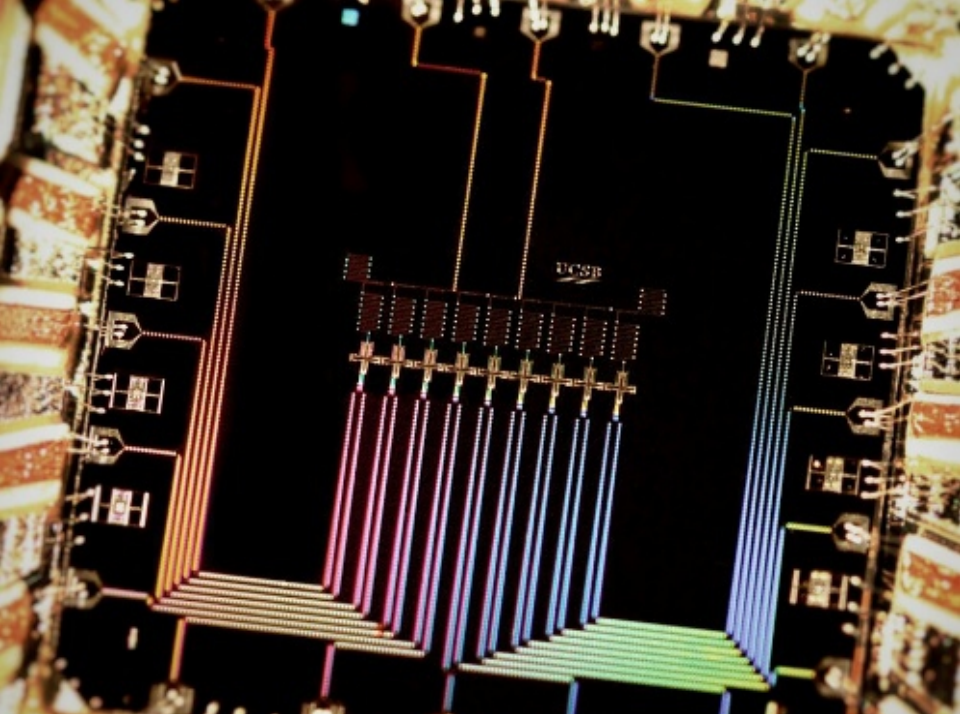
1. Interaction-free measurement and forward scattering - *Physical Review A* 58 (1998) 4206
2. Gravitational self-localization in quantum measurement - *Physical Review A* 68 (2004) 032110
3. Theory of a double-dot charge detector - *Physical Review B* 73 (2006) 235343 (Geszti Tamás, Bernád József Zsolt)
4. Quest for quantum superpositions of a mirror: high and moderately low temperatures - *Physical Review Letters* 97 (2006) 250404 (Bernád József Zsolt, Diósi Lajos, Geszti Tamás)
5. Postselected weak measurement beyond the weak value - *Physical Review A* 81 (2010) 044102

Books:

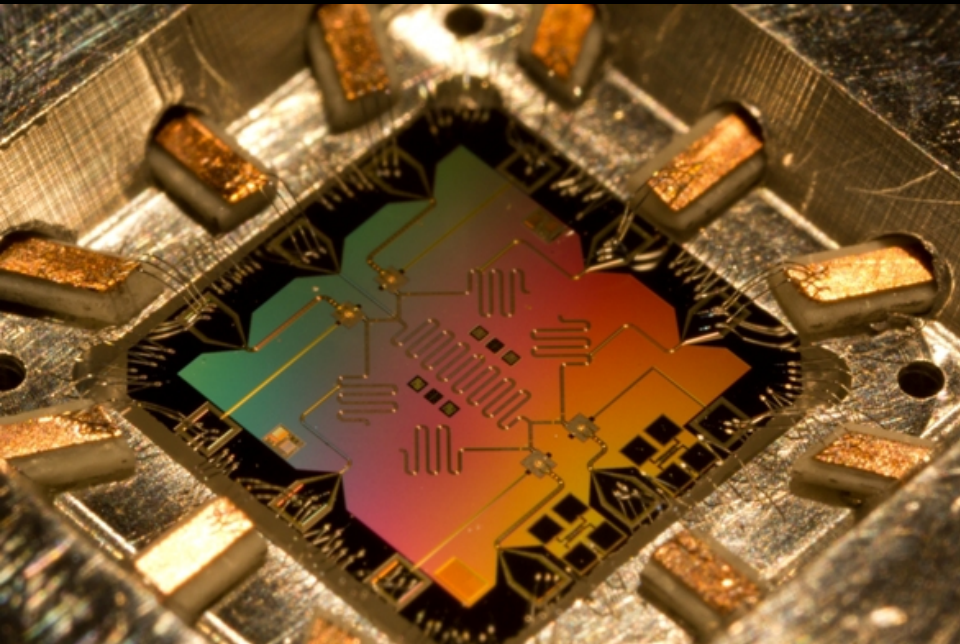
- *Physical models of neural networks* (World Scientific, Singapore 1990)
Japanese translation: 1992 (translated by Tomoya Akiba; ISBN 4-8427-0241-9)
- *Kvantummechanika* (egyetemi tankönyv, Typotex 2007, 3. kiadás 2014)



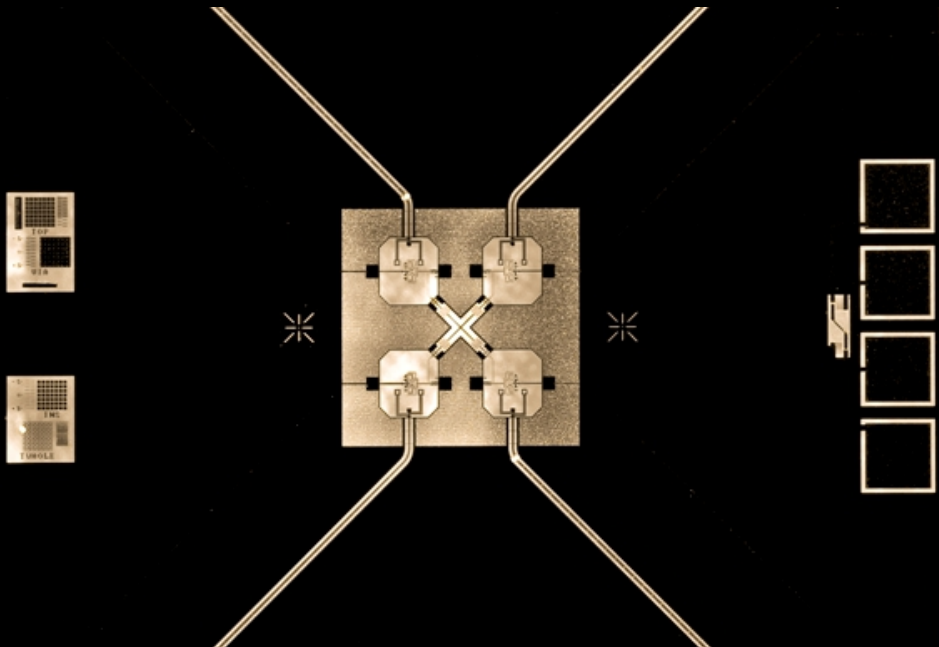
Superconducting circuits at the surface code threshold for fault tolerance



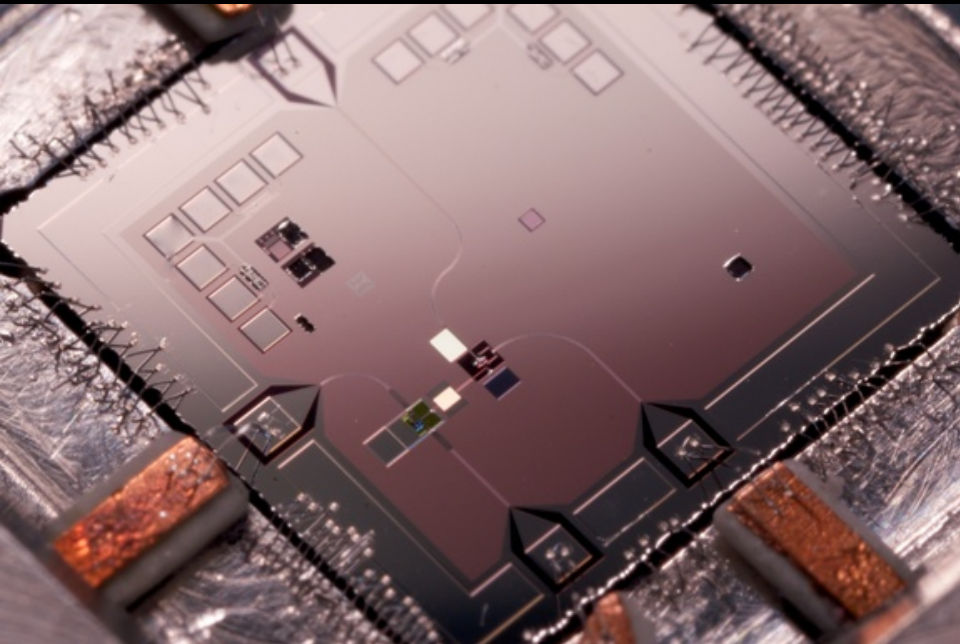
State preservation by repetitive error detection in a superconducting quantum circuit



Superconducting Qubits featured by the BBC



Superconducting Qubits featured in the New York Times



AAAS Science "Breakthrough of the year"