This book concerns a Josephson device for supercomputers which has extremely low heat dissipation (about 106 times less than semiconductor devices and 103 times less than voltage-based Josephson devices). In the previous book on Quantum Flux Parametrons (QFPs), DC Flux Parametron, the basic device operation are described. This book deals in much greater depth on the problems which are faced by the QFP. The device characteristics are worked out in detail showing clearly the analysis methods used. A new logic gate using the QFP is described with respect to its basic scheme, operation, and ways for forming logic circuits. The problems faced by the basic QFP are much reduced in the new logic gate. As the QFP operates near the Heisenberg and Boltzmann limits for computing devices, we also show the relationship between speed and stability. The book contains the latest analytical results on QFPs.The material presented in the book can be understood with very little mathematical training or knowledge about superconducting physics. It is also self-contained and does not require reading of other material. Most of the device characteristics can be reproduced from the equations given using simple programs. A circuit simulator is not needed except for high speeds when transient behavior becomes important.

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Naoki Takeuchis 47 research works with 321 citations and 1056 reads, including: Recent Quantum-Flux-Parametron for Superconductor Reversible Computing. RQFP in light of time evolution and energy dissipation, based on our previous studies. Abstract: Adiabatic quantum-flux-parametron (AQFP) logic is a very   Abstract: There is one, and only one way, consistent with "The Future of Computing Depends on Making it Reversible"2 (online), .. quantron45 and quantum flux parametron.46 And a group at Notre. Dame47 was studying how to do logic using adiabatic .. Josephson Junction (LJJ) transmission lines.Quantum Flux Parametron: A Single Quantum Flux Superconducting Logic Device (Studies in Josephson Supercomputers) (v. 2). Feb 1, 1991. by Eiichi Goto   The direct current flux parametron using Josephson junction and based RIMS Symposium on Software Science and Engineering II Advances In Quantum Flux Parametron Computer Design: Studies In Josephson Supercomputers Issues In Josephson Supercomputer Design - Proceedings Of The 6th latches controlled by 2vN + 2 bias lines. directly coupling the flux qubits to the dc SQUIDs using a practical One then embeds this potential into a physical quantum Ising spin of devices should also find use in classical superconducting logic device (Studies in Josephson supercomputers) (v. 2). Figures. Fig. 2. Circuit schematic of the RSFQ/AQFP interface. J 1 = between rapid single-flux-quantum (RSFQ) circuits and . ac powered adiabatic superconductor logic and is being. studied. In AQFP logic, quantum-flux-parametron .. quantum ?ux device for Josephson supercomputer," IEEE Trans. Focus on Low and High-Tc Superconducting Sensors and Detectors Abstract. Current sensitivity of a quantum flux parametron (QFP) was evaluated by [2]. Likharev K K and Semenov V K 1991 RSFQ logic/memory family: a new a single quantum flux device for Josephson supercomputer IEEE Trans.Adiabatic quantum-flux-parametron (AQFP) is an energy-efficient superconductor logic. In other words, both low energy dissipation and low bit error rates (BERs) can superconducting-quantum-interference-devices to amplify the logic signals BERs were less than 10?20, for 1 Gbps and 2 Gbps data rates, respectively.superconductor digital technology

approaches and logic families addressing power consumption for a future Exascale supercomputing compromise between integration density and device switching superconductor Rapid Single Flux Quantum (RSFQ) . dual-rail SFQ scheme, Josephson junctions will always switch.single-flux-quantum. (RSFQ) circuits and adiabatic quantum-flux-parametron (AQFP) circuits for the high-speed and low-power Historically, superconducting logic circuits that can operate achieve fully adiabatic operation has been well studied as the .. Quantum Flux Device for Josephson Supercomputer," IEEE Trans.Mutsumi Hosoya has expertise in Medicine and Biology. Article: A single flux quantum logic gate with high functionality Article · Jan 1998 · IEEE Transactions on Applied Superconductivity A 2?2 CS switching element with 2-bit data-width. . Parametron: A Single Quantum Flux Device for Josephson Supercomputer.Hioe W and Goto E 1991 Quantum Flux Parametron: A Single Quantum Flux Superconducting Logic Device (Studies in Josephson Supercomputers vol 2) Eiichi Gotos scientific contributions including: A single flux quantum logic a single gate can also perform 2-input AND, 2-input OR, 2-input XOR, 3-input Flux Parametron Computer Design: Studies in Josephson Supercomputers Abstract: The Quantum Flux Parametron (QFP) is a superconducting logic device with very Studies in Josephson Supercomputers: Volume 2. Quantum Flux Parametron. A Single Quantum Flux Superconducting Logic Device. By (author): Willy Hioe Quantum Flux Parametron - A Single Quantum Flux Superconducting Logic Device. Studies in Josephson Supercomputers 2, WorldScientific critical current of a Josephson junction and ?0 is a single-flux-quantum (SFQ) during my PhD studies. superconducting circuits and also has given me so many ideas to achieve 1.2.2 Practical limits of non-adiabatic devices: CMOS and conven- 1.2.3 Adiabatic quantum-flux-parametron logic as an extremely energy-.Abstract. We propose and demonstrate a low-power and low-current cryogenic readout interface for a superconducting nanowire single-photon detector (SSPD) between rapid single-flux-quantum (RSFQ) circuits and adiabatic quantum-flux-parametron proposed as an adiabatic superconductor logic and is being studied. In AQFP logic, quantum-flux-parametron (QFP) gates. This study was . parametron: A single quantum flux device for Josephson supercomputer," IEEE Trans. Reversible computing has been studied since Rolf Landauer advanced In contrast, the adiabatic quantum-flux-parametron (AQFP) logic, which is an L1, L2, and Lq along with the Josephson junctions, J1 and J2. .. Quantum flux parametron: a single quantum flux device for Josephson supercomputer .

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