

# Investigasi sirkuit desain elektronik berkecepatan tinggi superkonduktif dan aplikasi = Investigation into high speed superconductive electronic circuits design and applications.

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## Abstrak

[Superkonduktivitas adalah fenomena yang terjadi pada beberapa material tertentu, yang mengakibatkan hilangnya hambatan listrik pada temperatur tertentu. Dengan kata lain, suatu aplikasi yang menggunakan fenomena ini dapat mencapai suatu kecepatan tinggi dengan energi yang sangat rendah. Hal inilah yang menjadi daya tarik para ahli untuk mengembangkan teknologi tersebut.

Pada skripsi ini, introduksi tentang sirkuit elektronik berkecepatan tinggi superkonduktif dan Rapid Single Flux quantum (RSFQ logic & family akan dibahas secara mendetail. Perangkat lunak NioPulse digunakan untuk simulasi, optimalisasi, layout dan extract sirkuit RSFQ superkonduktif sirkuit, termasuk komponen utama RSFQ, logic & gates RSFQ, flip flops dan DC/SFQ converter. Semua proses dari simulasi dan extraction telah dijelaskan secara mendetail.

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Superconductivity is a phenomenon occurring in some specific materials, which resulted in the loss of electrical resistance at a certain temperature. In other words, an application that uses this phenomenon could achieve a very high speed with only using a very low energy. This is the appeal to the experts to develop the technology.

In this thesis, the introduction of high-speed superconductive electronic circuits and Rapid Single Flux Quantum (RSFQ) logic family will be discussed in detail. NioPulse software used to design, simulation, optimization, layout and extract the circuit superconductive RSFQ circuits; including the main components RSFQ, RSFQ logic gates, flip flops and a CD/SFQ converter. All the complete process from simulation to extraction process has been described in detail.; Superconductivity is a phenomenon occurring in some specific materials, which resulted in the loss of electrical resistance at a certain temperature. In other words, an application that uses this phenomenon could achieve a very high speed with only using a very low energy. This is the appeal to the experts to develop the technology.

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