

**SUDAN UNIVERSITY OF SCIENCE AND TECHNOLOGY  
COLLEGE OF POST GRADUATE STUDIES**

**Current Rectification and Amplification by Two  
Metal Contacts in A superconducting State**

**A STUDY SUBMITTED AS PARTIAL FULFILLMENT OF REQUIREMENT  
FOR THE DEGREE OF M. Sc. IN SOLID STATE PHYSICS**

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(

(الآية 61 من سورة الفرقان)

# *Chapter one*

## *Introduction*

# *Chapter two*

*A Particle in a potential barrier*

# *Chapter Three*

## *The Operation of Diodes and Transistors*

# *Chapter five*

*The rectification and amplification properties of diodes  
and transistors in a superconducting material  
(on a nano scale)*

# *Chapter Four*

*The current density in a super conductor*