

ANDREW KSENDZOFF



TABLE OF CONTENTS

- Intro
- Base Concepts
- SQUID Basics
- DC SQUIDs
- RF SQUIDs
- Applications



INTRO

- Superconducting Quantum Interference Device
- Extremely sensitive magnetometer

B A S C

SUPERCONDUCTIVITY

- Conducting electricity with no resistance and no EMF
- Electrons form Cooper pairs to move freely though ion lattice

JOSEPHSON JUNCTION

- Superconducting material separated by an insulating 30Å barrier
- At the critical current, Cooper pairs tunnel in an oscillatory manner though the barrier
- Creates an AC voltage across barrier

MEISSNER EFFECT

 Superconductors expel flux



FLUX QUANTIZATION

- Flux is quantized
- > Exists only as multiples of the flux quantum Φ_{\circ}



SQUID BASICS

- 2 main categories:
- DC SQUIDs
- RF SQUIDs



DC SQUIDS

- 2 Josephson junctions in a coil
- More sensitive than RF
 SQUIDs





RF SQUIDS

- Single Josephson junction
- Less sensitive than DC SQUIDs
- Cheaper to produce





APPLICATIONS

- Medical
- Geological
- Quantum Computing