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SUPERCONDUCTING SQUID MEASUREMENTS

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Abstract

The basic properties of a thin film, high critical temperature Superconducting Quantum Interference Device (SQUID) are studied. The SQUID is made of yttrium barium copper oxide ($Y_1Ba_2Cu_3O_7$) which becomes superconducting at about 90°K

This experiment consists of three parts.

1. Part 1: The basic squid properties are studied. These measurements include a study of the Josephson DC Effect and the direct observation of flux quantization.

2. Part 2: The AC Josephson Effect is observed and the measurements lead to a determination of h/e. A microwave generator is used for this purpose.

3. Part 3: The transition temperature of the superconducting material is measured using a silicon diode as a thermometer. The temperature of the squid is varied and the transition temperature to the superconducting state is determined.

The details are described in the following text which contains a section for each of the three parts. The Appendix contains the squid electrical and mechanical specifications.

REFERENCES

1. Chapter 21, pp. 21-1 to 21-18 in Feynman Lectures on Physics Vol. 3, by Feynman, Leighton, and Sands.