

II. MICROWAVE SPECTROSCOPY*

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A. WORK COMPLETED

1. MICROWAVE MAGNETORESISTANCE MEASUREMENTS

This work has been completed by Charles B. Friedberg and submitted as a thesis to the Department of Physics, M. I. T., May 1968, in partial fulfillment of the requirements for the degree of Bachelor of Science. A summary of the thesis research follows.

The magnetoresistance of a conducting solid is measured at high frequencies through the techniques of microwave spectroscopy. The measurement is based on the detection of electromagnetic power absorbed by conduction electrons under the conditions imposed by a resonant cavity and an external magnetic field. The magnetic field dependence of this power absorption is calculated and verified experimentally within one order of magnitude for a thin copper film. The method that has been developed has potential application to the problem of detecting electronic conductivity in organic substances, particularly in certain bio-molecules that are important in life processes.

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2. ELECTRONIC CONTRIBUTION TO ULTRASONIC ATTENUATION IN A METAL FILM

This work has been completed by Morris J. Markovitz and submitted as a thesis to the Department of Physics, M. I. T., May 1968, in partial fulfillment of the requirements for the degree of Bachelor of Science. A summary of the thesis research follows.

An experiment designed to measure the electronic contribution to the ultrasonic acoustic attenuation coefficient in a metal is described. Although the point at which

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final results would be obtained was not reached, a complete description of what was done, and what further results should have been achieved, is presented. It was necessary to design and build a resonant cavity. Until that time, useful (but incomplete) experimentation had been performed with another cavity. The new cavity has now been built, but further refinements are needed before it can be used.

Other possible experiments that may be performed with approximately the same experimental procedure are mentioned.

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