

II. MICROWAVE SPECTROSCOPY

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RESEARCH OBJECTIVES

This group has a broad general interest in the study of metals by means of UHF and microwave frequency experiments, in particular by the use of microwave phonons. Acoustic methods are now sufficiently well developed at microwave frequencies and below to generate useful information about the electronic structure of metals and superconductors. Examples from our current experiments include work on geometric resonances in gallium, and measurement of the temperature dependence of the superconducting energy gap in indium.

Efforts to improve the acoustic techniques and to understand the behavior of the microwave phonon transducers, both coherent and incoherent, will continue. Development of the equipment for quantitative surface impedance studies at low temperature is essentially complete. There are some preliminary experiments on the use of laser beams for optical spectroscopy of metallic reflection.

Our traditional interest in electron paramagnetic resonance has not ended. The cross-relaxation studies continue to raise new questions. Cooperation in the use of our EMR facilities is exemplified by studies of the atomic hydrogen concentration in electrolysis with Professor H. H. Uhlig of the Department of Metallurgy, M. I. T.

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