II. MICROWAVE SPECTROSCOPY*

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A. WORK COMPLETED

1. FREE RADICALS IN PHOTOLYSIS OF ORGANIC COMPOUNDS AS STUDIED BY EPR

This work has been completed by Albert H. Teich and submitted as a thesis to the Department of Physics, M.I.T., May 1964, in partial fulfillment of the requirements for the degree of Bachelor of Science. An abstract of the thesis follows.

The effects of light on various organic compounds have been studied in this exploratory experiment, by using a unique cavity that permitted the illumination of materials during EPR investigation. Two compounds known to give free radicals by photolysis, azobisisobutyronitrile and pinacolone, were studied in this manner but with negative results. A theory proposing the existence of EPR in an organic photoconductor was proposed; the experimental results are inconclusive. Two amino acids were examined after irradiation with gamma rays and the resonance spectrum of one, glycine, is reported.

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2. LINE SHAPES OF PARAMAGNETIC RESONANCES IN RUBY

This work has been completed by Stewart A. Sterling and submitted as a thesis to the Department of Physics, M.I.T., May 1964, in partial fulfillment of the requirements for the degree of Bachelor of Science. An abstract of the thesis follows.

The absorption and dispersion line shapes for 0.05 per cent ruby were studied by using a paramagnetic resonance spectrometer for orientations of 0° and 90° with respect to the magnetic field. The line shapes were found to be Lorentzian in nature. Values for T_2 for all resonances and for T_1 for the lower resonance at 90° were found.

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B. A SURVEY OF MAGNETO PLASMA EFFECTS BY A REFLECTED LASER LIGHT

This report is a summary of a Master's thesis with this title submitted to the Department of Physics, M.I.T., January 20, 1964.

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(II. MICROWAVE SPECTROSCOPY)

The light absorption in Sn, Ga, Cu, and InSb in the presence of a magnetic field was observed by measuring the intensity of the reflected light from these media while changing the field from 0 to 10 kilogauss. An He-Ne gas laser with $\lambda = 6328$ Å was used as a light source, since its extremely small bandwidth was most suitable for fine-structure analysis.

Possible absorption processes considered were interband transitions and plasma oscillations.

Experimental results showed that no appreciable change took place in the intensity of the reflected light down to 0.1 per cent of the reflected signal which was the minimum detectable signal allowed by the noise.

The noise is primarily due to the fluctuation of the laser output; it was shown that the detection of a signal variation of less than 0.1 per cent of the reflected signal was impossible with a laser as a light source.

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