II. MOLECULAR ENERGY TRANSFER AND SPECTROSCOPY*

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A. RESONANCE FLUORESCENCE

If a fluorescent molecule is irradiated with monochromatic light, a resonance fluorescence series is emitted. Effects of added gas on the emission intensities can be interpreted to give specific energy-transfer rates.[1]

The absorption line of molecular iodine that lies closest to the 6328.17 Å line of the neon laser has been identified by means of echelle-spectrograph analysis. Equipment is being readied to analyze the fluorescence from iodine vapor stimulated by this line. Work is also beginning on excitation of iodine fluorescence by the Cd 5086 and Ar II 5145 lines, and oxygen fluorescence by Hg 1849.

B. INFRARED-OPTICAL DOUBLE RESONANCE

Spectrum analysis and energy relaxation rates for a wide variety of molecules can be obtained if the ground-state vibrational levels are pumped by the output of a carbon dioxide infrared laser. Work is now going on toward development of tunability of the laser transitions, in order to accomplish selective excitation of the molecules.

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References

1. J. I. Steinfeld and W. Klemperer, J. Chem. Phys. 42, 3475 (1965).

*This work is supported by the National Science Foundation (Grant GP-6504), the Petroleum Research Fund (Grant 2523-A5), and the Sloan Foundation for Basic Research (M.I.T. Grant).