

## V. ATOMIC RESONANCE AND SCATTERING\*

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### RESEARCH OBJECTIVES AND SUMMARY OF RESEARCH

Our group is concerned with atomic structure and interactions. We are also involved in applications of superconductivity to problems in atomic physics and to the detection of low-energy signals.

1. Spin-Exchange Scattering. We are continuing experiments to measure spin-dependent differential cross sections for low-energy atomic collisions. During the past year, we have completed experiments for determining the exchange potential between various alkalis. We have initiated a study of alkali-molecule collisions, and are undertaking a search for loosely bound triplet molecules.

2. High-Field Hydrogen Maser. We have completed a determination of the ratio of the proton and electron magnetic moments in hydrogen to a precision of one part in  $10^8$ . A determination of the deuteron moment is under way.

3. Superconducting Detector. In an attempt to undertake scattering experiments with atomic hydrogen, we are investigating a new type of superconducting detector designed to detect energy pulses of 1 eV or less. The device is potentially capable of detecting infrared radiation with unprecedented sensitivity. We have succeeded in counting electrons with the detector and are now investigating its low-energy limit.

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\*This work was supported by the Joint Services Electronics Programs (U. S. Army, U. S. Navy, and U. S. Air Force) under Contract DA 28-043-AMC-02536(E), and in part by the National Science Foundation (Grant GP-13633).

