II. MOLECULAR COLLISIONS*

Academic Research Staff

Prof. J. L. Kinsey

Graduate Students

M. K. Bullitt
Gloria DiMoplan
R. P. English
C. H. Fisher
K. J. Kaufmann
N. C. Lang
J. R. Lawter
H. V. Lilenfeld

RESEARCH OBJECTIVES

1. Reactive Scattering

We are investigating the reactions of alkali-metal atomic beams with crossed beams of a number of inorganic and organic halides. Angular distributions of the products, and in some cases their recoil energy distributions, are measured. A large number of molecules covering a wide range of chemical properties will be studied.

2. Elastic and Inelastic Nonreactive Scattering

Work is in progress in several areas.

a. Continuing our earlier work on He-H_2 collisions, we are now measuring total cross sections for scattering of He beams by H_2 as a function of incident energy in the thermal range. Some other systems with either He or H_2 as one of the participants are planned.

b. Experiments are in progress on differential elastic scattering of alkali atoms by iodine atoms.

c. Our earlier work on long-lived complexes in molecular collisions is being extended in two ways. In a nozzle beam system, the velocity distributions of atoms scattered following complex formation will be analyzed to obtain refined information about inelastic processes associated with the complexes. In the second approach, several series of chemically related compounds giving complexes in collisions with alkali atoms will be compared in the hope of finding correlations between complex forming tendency and chemical structure.

J. L. Kinsey

*This work is supported in part 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).