THE SCATTERING OF LOW ENERGY ELECTRONS FROM

HYDROGEN, HELIUM, AND ARGON.

A Thesis
Presented for the degree of Doctor of Philosophy

in

The University of Adelaide

by

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1967.
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SUMMARY

A modulated crossed beam apparatus has been used to study the angular distribution of elastically scattered electrons from helium, argon, atomic hydrogen, and molecular hydrogen. The energies of the incident electrons used in the investigation ranged from 50 electron volts to 200 electron volts, and the electrons were observed over the angular range from 25° to 130°.

Details are given of the high current density, multistage electron gun which produced the incident electron beam. A parallel plate electron spectrometer was used to analyze the energy of the scattered electrons.

The measurement of the angular distribution for elastic scattering of electrons from helium at incident energies of 50, 75, 100, and 200 electron volts is described. The results are compared with other measurements and are discussed in the framework of recent calculations.

A modulated argon beam has been used to obtain the angular distribution of 50, 100, 150, and 200 electron volt electrons elastically scattered from argon. The present results are compared with other results which were obtained using a different technique.

An investigation of the angular distribution of elastically scattered electrons from molecular hydrogen has been undertaken. These results, which play an important role in determining the elastic scattering from atomic hydrogen, are compared with other
measurements and with theoretical calculations.

A beam containing a high percentage of atomic hydrogen has been produced in a low pressure tungsten furnace. The percentage of atomic hydrogen in the beam was determined with a mass spectrometer. The beam has been used to determine the angular distribution of elastically scattered electrons from atomic hydrogen for incident energies of 50, 75, 100, and 200 electron volts. The results, which constitute a sensitive test of approximations in the quantum theory of scattering, are compared with several calculations.