

I. PHYSICAL ELECTRONICS

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RESEARCH OBJECTIVES

Present objectives lie in three separate areas of physical electronics. The first relates to the properties of semiconductors, the second to thermionic-emission problems, and the third to the improvement of instrumentation.

The electrical properties of p-n junctions are being investigated as a function of temperature and applied voltage. The observations include a careful determination of current flow as a function of voltage and also of the capacity of the junction as a function of voltage. Analysis of these observations yields interesting data, the interpretation of which will serve to measure the applicability of present theories to the electrical properties of junctions.

The thermionic studies now in progress relate in one way or another to the direct conversion of heat to electric power through the use of thermionic emitters. Three studies are being made. One concerns the energy distribution of electrons emitted from a hollow cathode under high-vacuum conditions. The purpose of this study is to determine whether or not electrons emitted under these circumstances take on an abnormal energy distribution that is not characterized by the temperature of the emitter. The second study is designed to determine the cesium adsorption properties on the well-defined crystallographic directions of tungsten as a function of the cesium pressure and the tungsten temperature. In the third study an attempt is being made to interpret experimental data by means of a theoretical analysis that is dependent upon the fundamentals of physical electronics.

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