

III. SOLID STATE PHYSICS

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A. ELECTRICAL BREAKDOWN IN GERMANIUM AT MICROWAVE FREQUENCIES

Measurements of electrical breakdown in germanium are being continued on samples that have different impurity concentrations. Figure III-1 is a typical curve that shows the variation in conductivity as the electric field is changed.

An attempt is being made to correlate a theory with the experimental data. A distribution function of the density of electrons as a function of energy is being derived on the basis of the Boltzmann transport equation, which includes ionization and volume recombination as the only inelastic processes that occur. Then the equilibrium number of electrons will be determined by the condition that the ionization rate of neutral impurities equals the recombination rate of electrons.

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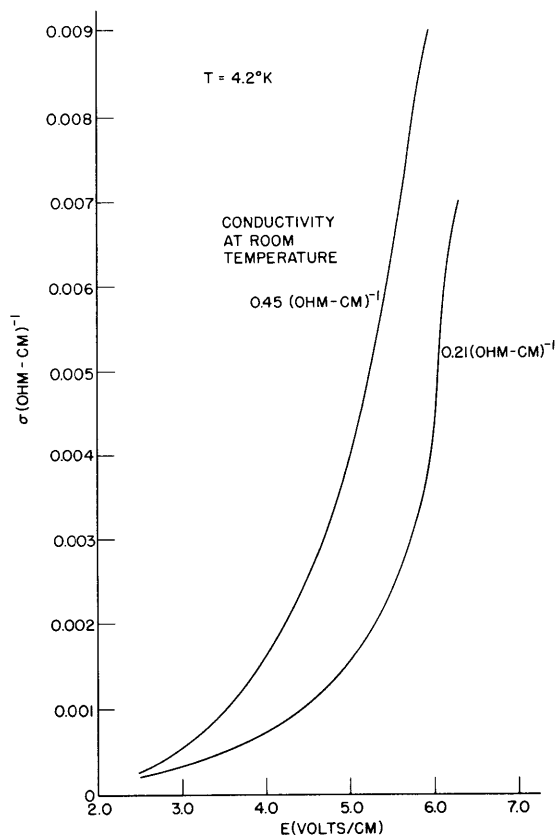


Fig. III-1

Variation in conductivity of n-type germanium with change in electric field.