

MEASUREMENTS OF THE RADIAL DEPENDENCE OF THE NUMBER DENSITY OF  
FREE ELECTRONS AND ELECTRON TEMPERATURE IN AN "EIERUHR" PLASMA

by

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Abstract

In a linear device called "Eieruhr" the radial dependence of the number density of free electrons and the continuum intensity have been measured by means of Faraday rotation of ruby laser light and spectroscopic measurements respectively.

The maximum temperature in a He plasma is 400 000 °K. The pressure on the axis of a Helium plasma is about 1 atm, whereas the pressure off the axis is less than 1/10 atm; this has been found also by O. Klüber by quite different measurements. This pressure rise comes about essentially due to two different effects. The first one occurs in the boundary of the plasma column and is based on the fact that ionized particles diffuse outward while neutral particles diffuse more inward. The second one is known as the Nernst-Ettingshausen effect, which states that an electric current can flow perpendicular to both a magnetic field and a temperature gradient. In plasma physics up to now little importance has been attached to the latter effect. The azimuthal current  $j_s$  which is caused by both effects together with the external magnetic field strength  $B_z$  yields a pressure gradient.