

Abstract Submitted  
for the GEC10 Meeting of  
The American Physical Society

**Electron Velocity Distribution Function in Beam Plasmas<sup>1</sup>**

ALEXANDER MUSTAFAEV, St. Petersburg State Mining Institute (Technical University), VLADIMIR DEMIDOV, West Virginia University — The characteristic features of the relaxation of the energy and momentum distribution functions of the electrons in plasma produced by a low-voltage beam discharge in helium are investigated. It is shown that the energy of an intense electron beam may relax due to the wave excitation. The critical currents corresponding to a jumplike transition from one relaxation mechanism to another are measured. An intense electron beam is found to become more isotropic in the course of its interaction with Langmuir waves in collisionless plasma. The cross section for quasi-elastic collisions between the electrons and Langmuir plasmons is estimated. The wave nature of the beam-plasma mechanism for the relaxation of the anisotropic electron energy distribution function is demonstrated. The experimental threshold criterion for the energy relaxation of an intense monoenergetic beam is obtained. The threshold criterion for the relaxation of the anisotropic electron energy distribution function is universal in character regardless of the cause of anisotropy. The authors are grateful to Prof. V. S. Litvinenko for permanent support.

<sup>1</sup>This work was supported by the NSF under grant CBET-0903635 and Ministry of Education of the Russian Federation.

Vladimir Demidov

Date submitted: 08 Jun 2010

Electronic form version 1.4