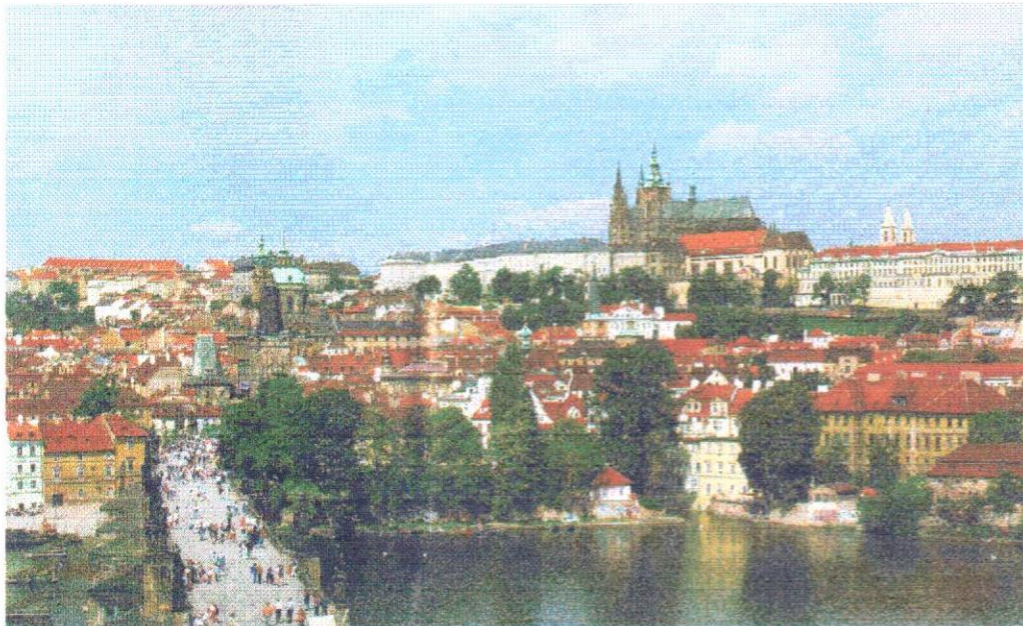


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Influence of End Potential Plates on Plasma Confinement

S. Yu. Taskaev

*Budker Institute of Nuclear Physics
avenue Lavrent'ev 11, 630090 Novosibirsk, Russia*

Hot target plasma was obtained in an open trap AMBAL-M from arc source located behind the mirror [1]. Longitudinal electron current in the plasma was found and investigated. In paper [2] the model of longitudinal electron current generation and the model of effective electron heating were presented and discussed. In this paper transverse ion current in the plasma periphery has been considered. Radial and longitudinal profiles of plasma density, potential, electron temperature and longitudinal current density have been measured. The main classical (collision) processes leading to transverse current were considered in detail.

The significant longitudinal electron current experimentally detected was found to be a part of plasma gun discharge current. Electron current of the inner ring cathode flows along the magnetic field lines to plasma receiver, then it taken up by end of device, then it returns along conducting vacuum chamber and finally it is closed upon the outer ring anode in transporting area on plasma periphery. The current shorting was determined to be provided by the following processes at plasma periphery: 1) nonambipolar transverse diffusion from ion-ion collisions; 2) transverse current suppressed essentially by magnetic field in positive radial electric field from electron-ion collisions, which is increased due to conductivity fluctuations; 3) longitudinal current from the extending outward grounded frame of a solenoid to the anode of the gun. The big value of the current is explained by the non-equilibrium radial electric field in plasma, given by the arc source electrode potentials. Non-equilibrium radial electric field also leads to the Kelvin-Helmholtz instability development, stochastic heating of ions and increased transverse diffusion of plasma.

This fact shows the possibility of change in plasma confinement by control of potential radial profile using end potential electrodes.

[1] T. D. Akhmetov et al. *Plasma Phys. Reports* **23** (1997) 988.

[2] S. Yu. Taskaev. *Electron heating in mirror by end potential plates*. Int. Congress on Plasma Physics, Praha, Czech Republic, June 29 - July 3, 1998.