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Editors: K. Szegő, T.N. Todd and S. Zoletnik

Obtaining of Hot Plasma in a Mirror by an Arc Source.

Sergey Yu. Taskaev

Budker Institute of Nuclear Physics, 11 Lavrentiev ave., 630090 Novosibirsk, Russia

Hot plasma was obtained without additional heating in an open magnetic trap AMBAL-M from arc source located behind the mirror. A number of works were dedicated to the study of this plasma [1–6].

The present paper is a general one. The main mechanism of heating and confinement is presented. A number of experimental peculiarities allowed to obtain hot dense plasma are determined. Influence of a narrow ring dense plasma jet on transverse current is indicated. Influence of a non-equilibrium radial electric field formed by arc source electrode potentials on Kelvin–Helmholtz instability development, stochastic heating of magnetized ions, formation of longitudinal electric field, longitudinal current, and population of fast electrons is shown. Electron heating is investigated. It is found that, the fast electron flow heats the trapped electrons effectively (due to an ambipolar potential and the high velocity of the flow electrons) as a result of the Coulomb collisions. The results are generalized using in open magnetic traps.

Two of the specific features of the magnetic mirror device manifest themselves in these experiments. First, the plasma behavior is well described by classical phenomena, i.e., by collisional processes. Second, the possibility of controlling over the potential radial profile allows us to vary the plasma heating and confinement.

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- [4] S. Yu. Taskaev. *Plasma Physics Reports* 25 (1999) 461–468.
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- [6] T.D.Akhmetov, et al. *Plasma Physics Reports* 26 (2000) 152–156.