On the heating of ions in Z-pinches [[1]](#footnote-1)\*)

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In this paper an overview and the theoretical analysis of the methods of plasma heating up to thermonuclear energies are given for Z-pinches. The following methods are considered:1) Joule heating of electron component with further transfer of energy from electrons to ions, 2) heating of the ions due to their acceleration in Ohmic electric field of the pinch discharge, and 3) heating of the ions resulting from ion acceleration caused by electric field induced by fast increase of magnetic field [1-4].

It is shown that acceleration of plasma ions resulting from magnetic field compression is much more effective compared to the one associated with getting energy from collisions with thermal electrons as well as with acceleration of ions in Ohmic electric field. Electric field caused by fast increasing of magnetic field accelerates ions along Larmour circumference. Ion energy growth in this case is proportional to their energy. It finally leads to the ion energy distribution close to thermal one. At the latest stage of this type of acceleration however an essential number of ions get energies which exceed thermal energy as well as the energy from Ohmic heating.

The advantage of ion heating in Z pinches is shown in comparison with other thermonuclear plasma systems such as magnetic confinement systems where plasma is heated by ion beams as well as the inertial confinement systems where plasma is heated by radiation.

Литература

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