ICR heating using magnetic beach method

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It is supposed that Alfven oscillations must use at the ICR heating by magnetic beach method. These oscillations must exited in the region of the strong magnetic field which exceeds resonance value. The wave length of the oscillations diminishes as the oscillations approach the resonance zone, the phase and group velocities tend to the zero - the oscillations stop. In the result the oscillations are absorbed in the cyclotron resonance zone regardless the intensity of the dissipative processes.

However in inhomogeneous plasma column exist continuous spectrum of the Alfven oscillations (Alfven continuum) as the their discrete spectrum. Oscillation of continuum endure so called Alfven resonance - transform into low hybrid oscillations. The last oscillations have significant longitudinal electric field causing active interaction with electrons.

The correct analysis magnetic beach ICR heating must be two dimensional taking into account longitudinal inhomogeneity of the magnetic field and transversal inhomogeneity of the plasma density. In real conditions magnetic field inhomogeneity is weak. This circumstance allows to use quasiclassical approximation at the description of the Alfven oscillations longitudinal structure.

The interest to the magnetic beach heating is caused by the experiments on the cosmic plasma thruster VASIMR. In present paper it is proved that in the condition which are typical for such plasma thrusters significant part of the electromagnetic energy injected into the plasma will spend not on the exiting of the discrete spectrum of the eigen Alfven oscillations but in the Alfven continuum/ This energy will absorb by the electrons.