Some possibilities of commercial RF ion source improvement

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New possibilities for the increasing of beam brightness and decreasing of energy spread of the working ion ($^{1}H^{+}$ or $^{4}He^{+}$) beam in commercial RF ion source are described. This type of sources is traditionally used in a nuclear microprobe.

The authors have solved numerically time-depended kinetic equation for *2-D* (in velocity coordinates) function distribution of working ions using a finite difference method. The ion distribution is settled in magnetically confined multi component plasma as a result of the following processes: cyclotron absorption of Fast Magneto Sonic Wave (FMSW), Coulomb's collisions of working ions with background plasma, birth and death of the ions.

The authors suggest utilizing of the axial symmetric "mirror" type magnetic trap for the plasma containment and settling the special *2-D* distribution for working ions using the FMSW at cyclotron resonance $\omega = \omega_c'$ (or $\omega = 2\omega_c'$) in the improved RF ion source. The optimized parameters and operating regimes of the source are calculated.