modelling of “MAGNETIC beach” ICR-HEATING OF IONS IN GOL-NB [[1]](#footnote-1)\*)

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In 2021, the experiments on the complete configuration of the GOL-NB multimirror trap were started at BINP [1]. The facility is designed to study multiple mirror plasma confinement in a steady state mode. The magnetic system of the device consists of the central trap, the long mirrors and the expanders at the both ends. A multiple-mirror or uniform magnetic field can be created in long mirrors. The target plasma is injected into the central trap through a strong plug and heated by neutral beams. The main aim of the scientific program of the facility is to study the confinement of warm plasma by multiple-mirror magnetic systems. It is important to develop methods for auxiliary plasma heating in the trap. In particular, heating of target plasma ions could allow controlling of ions collisionality and changing the mode of plasma flow in multiple-mirror sections. In this paper, we discuss the possibility of ICR heating of ions in the GOL-NB central trap using the “magnetic beach” method.

The analysis of plasma transparency regions [2] and numerical simulation in two-dimensional cylindrical geometry was used. The possibility of excitation of an Alfven wave in the GOL-NB plasma is estimated. The reference operation scenario [3] assumes the plasma
density of ~3∙1013 cm3 in the central trap, which is quite high for heating using the Alfven wave. To excite a wave in a high-density plasma, it is favorable to place the antenna in a strong field near the mirror and to increase the frequency accordingly [4]. In the calculations, a frequency of 13.56 MHz and a magnetic field of 1-1.5 T were chosen. It is shown that heating on the Alfven wave can be realized up to plasma densities of ~1013 cm-3. At the reference operation scenario the introduction icr-heating of the plasma periphery can improve the confinement of hot ions in the trap.

References

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/Mu/ru/CP-Skovorodin.docx) [↑](#footnote-ref-1)