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FIRST EXPERIMENTS WITH HF SYSTEM OF ION-CYCLOTRON BAND FOR GOL-NB FACILITY *)

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At the Budker Institute of Nuclear Physics SB RAS, work continues on the GOL-NB facility [1]. The GOL-NB facility is designed to study multiple-mirror plasma confinement in open systems in a quasi-stationary experiment [2]. The magnetic configuration of the facility consists of a central section with a magnetic field of 0.3 T, continued on both sides by long sections of a strong (4.5 T) field, operated on a uniform or a multiple-mirror mode, and expanders at the ends. A plasma gun creating the starting plasma is located in one of the expanders. Two neutral atom injectors with a total power up to one megawatt heat this plasma in the central section. Then the heated plasma flows out through the strong-field sections, where its flow depends on the operating mode of these sections [3].

In addition to the main work on studying the plasma flow in a multiple-mirror field, work is underway at the facility to create additional methods of heating the plasma. One of such methods is heating plasma ions using cyclotron resonance. For the central section of the GOL-NB, a “magnetic beach” scheme was proposed [5]. In this scheme [4], the wave-launching antenna is located in a stronger magnetic field of 1.3 T. The Alfven wave launched by the antenna moves along the field to the cyclotron resonance region, where the field is 0.89 T. The operating frequency of the generator is 13.56 MHz, and the output RF power can be increased to 25 kW. A double half-turn antenna and a matching scheme were created to launch the wave [6].

This paper presents the results of the first experiments with individual components and the entire system for ion-cyclotron heating for the central section of the GOL-NB facility.

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