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Development of a magnetic system and an ion beam formation system for the proton injector of the DARIA project

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The paper presents results of an upgrade of the GISMO ECR ion source at the IAP RAS in order to develop a proton injector, which in the future will be an integral part of the linear accelerator for the DARIA compact neutron source. The developed system uses an adapted open permanent magnet trap (NdFeB) to confine a plasma. The proton beam is extracted from the plasma using a three-electrode extraction system. The formation of a weakly divergent beam is achieved by using a magnetic lens in the form of a solenoid. The optimization of the extraction system is carried out using numerical simulation. The system for the formation of a proton beam that meets the requirements of DARIA was designed.

Keywords: ion source, high-current ion beams, ECR discharge, magnetic trap, ion beam formation system.

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