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Wed-Mo-Po3.02-02 [12]: The general appearance of the superconducting magnet system for the Gas-Dynamic Multimirror Trap

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The goal of the Gas-Dynamic Multimirror Trap (GDMT) project is to create a multi-functional experimental facility and lay the groundwork for future development of fusion applications of open-ended magnetic plasma confinement systems with linear axisymmetric configuration. Among the most promising plasma confinement concepts to be studied on this facility are the diamagnetic plasma confinement mode and plasma flux suppression by multimirror and helical magnetic sections [1].
The conceptual design of the GDMT installation is under development and assumes a modular construction principle, which allows the installation to satisfy the requirements of the experimental program. Regarding the magnetic system of GDMT, this means that it must be built from several types of universal modules, which could be assembled in a particular order according to demands of the experiment. By utilizing this approach and controlling the current in each of superconducting coils, which make up the modules, it is possible to facilitate a transition from one magnetic configuration to another. The confinement region of the magnetic system is a several meters long solenoid with diameter of magnetic coils ˜ 1.3m and axially uniform magnetic field. A certain experimental scenario requires that the magnetic field be ramped up from 0.3 to 3 T within 5 seconds, which implies than a special low AC-loss superconducting cable must be chosen for this part of the installation. In this paper we present the requirements for magnetic field distribution, preliminary calculations and a general appearance of the superconducting magnet system, along with an assessment of the parameters of superconducting materials necessary to create such a system.

[1]. P.A. Bagryansky, A.D. Beklemishev, V.V. Postupaev 2019 J Fusion Energ **38** 162

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