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Design and Analysis of Magnet System for Flili Testbed in EAST

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Abstract: To simulate the magnetic field environment in EAST Tokamak, and to study the flowing of liquid metal driven by electromagnetic force, and then to guide the liquid lithium limiter experiment in EAST preferably, it's necessary to develop a magnet system. In order to ensure the experiments are carried out smoothly, the running time of magnet system should be more than 1000s, the background magnetic field should be adjustable within the scope of 0˜2T, and the uniform magnetic field must be greater than 50mm×50mm. In this paper, the design and checking calculation of Helmholtz coil and electromagnet was carried out by ANSYS and MAXWELL respectively, to ensure the safe and stabilized operation of magnet coil, and to minimize the cost the testbed. Base on the analysis results, the yoke, ampere turns and radius of the magnet coil have significant effects on the magnetic field distribution, the parameters of power and cooling system, and the comprehensive cost of the testbed. Considering electrical and hydraulic parameter, and total cost of magnet system, A C-frame electromagnet was adopted whose number of turns are 16×8, and radius is 0.56m.

Keywords: EAST; Flili Testbed; Magnet System; ANSYS

Eligible for student paper award?

Yes

Author: Mr HU, Lexing (ASIPP)

Presenter: Mr HU, Lexing (ASIPP)

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