

短文

托卡马克等离子体的高精度快响应平衡控制系统的研究

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摘要

为了实现高功率波加热下等离子体的水平位移平衡控制,针对HT-6M托卡马克装置薄壁真空室的特点,成功地研制了由载流等离子体、薄壁真空室和反馈场磁体所组成的平衡控制系统.用1MW大功率GTO直流斩波器作为反馈控制磁场电源,并采用Bang—Bang控制模式的技术,使该系统响应快、控制精度高.在各种实验条件下,等离子体的实际水平位置控制在 $\pm 3\text{mm}$ 以内,相应的控制精度小于1.5%.

关键词 [核聚变](#) [等离子体](#) [平衡控制](#)

分类号

Research on Plasma Equilibrium Control System of High Precision and Fast Response for the Tokamak

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Abstract

In order to achieve plasma equilibrium control of horizontal position under high-power wave heating, an equilibrium control system for the HT-6M Tokamak with a thin-wall vacuum vessel has been studied and realized. The system is composed of the current carrying plasma, thin-wall vacuum vessel and feedback control magnetic field magnet. A 1MW GTO DC chopper is adopted for the power supply of feedback control magnetic field while the Bang-Bang control mode is used in this system. It makes the system have the ability of fast response and high precision. Under various conditions, the horizontal deviation of the controlled plasma is less than $\pm 3\text{mm}$ with a corresponding controllable precision better than 1.5%.

Key words [Nuclear fusion](#) [plasma](#) [equilibrium control](#)

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