Contribution ID: **329** Type: **Poster Presentation of 1h45m**

Modified Design of Power Supply System for 100 Tesla Pulsed Magnetic Field

Monday 28 August 2017 13:15 (1h 45m)

High pulsed magnetic field is becoming more and more widely used in physics, biology and materials. For serving scientific experiments better, a power supply system for 100 Tesla magnetic field is designed at Wuhan National High Magnetic Field Center (WHMFC). In the preliminary design, the 100 Tesla magnet consists of three coils in a coaxial structure. The outer coil is powered by pulse-rectifier generator in series to battery banks. The middle coil and the inner coil are energized by capacitor banks separately. Each coil is fired in designed sequence. Because of the magnet is a multi-coil system with a strong-coupling structure, the current of the outer coil will drop when the middle coil fired. And the current drop will cause adverse effects that the burden of the power supply and the stress of magnet increase. Based on analysis of the mathematical model for power supply circuit, a modified design for power supply system is proposed which is connecting a coupling transformer to the outer coil and the middle coil for the compensation of the current drop. Parameters of the coupling transformer and the requirements of power supply are also discussed. In order to verify the feasibility of the scheme, the simulation model based on the MATLAB/ Simulink platform is established and the tests are carried out on the prototype of three-coil magnet. Both simulation and experimental results verify the feasibility of the proposed design and the effectiveness of the compensation method.
Acknowledgements: The authors would like to acknowledge the supports of the National key research and development program of China (2016YFA0401702) and the Program for New Century Excellent Talents in University.

Submitters Country

China

Authors: DING, Hongfa (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology); ZHAO, Zhangfei (Wuhan National High Magnetic Field Center Huazhong University of Science and Technology); JIANG, Chengxi (Huazhong University of Science and Technology); XU, Yun; DING, Tonghai (Huazhong university of science and technology); Ms FANG, Xiao (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology); Dr REN, Tieqiang (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology); Prof. LI, Liang (Huazhong University of Science and Technology); Prof. PENG, Tao (Wuhan National High Magnetic Field Center)

Presenter: ZHAO, Zhangfei (Wuhan National High Magnetic Field Center Huazhong University of Science and Technology)

Session Classification: Mon-Af-Po1.12

Track Classification: H2 - Power Supplies and Flux Pumps