



MT 26
International Conference
on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: 1219

Type: **Poster Presentation**

Thu-Mo-Po4.01-06 [5]: Analysis of the commutation of the 24-pulse converter for high pulsed magnet outer coil power supply

Thursday 26 September 2019 08:45 (2 hours)

Wuhan National High Magnetic Field Center (WHMFC) has been working on high pulsed magnetic fields and designed the 100 Tesla magnetic system. The magnet adopts a three-coil structure and the outer coil is powered by a pulse generator rectifier. In order to ensure the temperature rise of the coil is reduced, the energy stored in the coil needs to be quickly released after the combined magnetic field reaches a maximum. However, there have two disadvantages by using a forced commutation device to switch the main circuit to the Crowbar freewheeling circuit, on the one hand, the negative end of the outer coil is suspended, and on the other hand, the grounding of the coil is caused to oscillate after forced commutation. Therefore, the rectifier should work in inverter model after the discharge is completed that can feed back the energy stored in the outer coil to the pulse generator. In order to ensure the safe operation of the rectifier and prevent the inverter from failing, this paper establishes a simplified circuit model of the 24 pulse rectifier system. According to the simplified circuit model and the actual power system parameters, the circuit equation for four rectifiers is established under different commutation overlap angles. the safe area for the 24-pulse converters commutation is be obtained based on the influence of four 6-pulse rectifiers in the commutation process analyzed which can resulting in commutation failure.

Authors: ZHAO, Zhangfei (College of Mechanical and Electronic Engineering; Suzhou University 2. Wuhan National High Magnetic Field Center Huazhong University of Science and Technology); DING, Hongfa (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology); DING, Tonghai (Huazhong university of science and technology); Dr XU, Yun (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology); Prof. LI, Liang (Huazhong University of Science and Technology); PENG, Tao (Wuhan National High Magnetic Field Center); Prof. PAN, Yuan (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology); LI, Peichen (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology)

Presenter: ZHAO, Zhangfei (College of Mechanical and Electronic Engineering; Suzhou University 2. Wuhan National High Magnetic Field Center Huazhong University of Science and Technology)

Session Classification: Thu-Mo-Po4.01 - Associated Technology II