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

Contribution ID: **1343** Type: **Poster Presentation**

Mon-Af-Po1.14-02 [28]: Transient Voltage Analysis of Air-Core Coils with Large Section

Monday 23 September 2019 14:30 (2 hours)

With the rise of power level of high power device like magnetic power supply systems of fusion device, the section size of smoothing and current-limiting reactor becomes larger and larger. To keep the linearity of inductance, the structure of air-core with vacuum pressure impregnation (VPI) casting is widely used. In this paper, a numerical method based on equivalent model is adopted to study the transient voltage process of air-core coil under the overvoltage excitation, focusing on the effect of dielectric constant, thickness of insulating medium, number of coil layers on the resonance frequency and voltage distribution of various layers. To verify the numerical analysis results from MATBLE and ATP-EMTP, multi-group and various coils prototype like single layer with resin, single layer without resin and so on are fabricated and tested, which demonstrated the accuracy of proposed analysis method. In addition, the research results can provide a reference of the insulation design and fabrication of large current coils with large section.

Authors: Dr LI, Chuan (Huazhong University of Science and Technology, Wuhan, 430074, China); Mr QIAN, Chengjin (Huazhong University of Science and Technology, Wuhan, 430074, China); Dr LI, Jiawei (Huazhong University of Science and Technology, Wuhan, 430074, China); Dr WANG, Pengyu (Huazhong University of Science and Technology, Wuhan, 430074, China)

Presenters: Dr LI, Chuan (Huazhong University of Science and Technology, Wuhan, 430074, China); Mr QIAN, Chengjin (Huazhong University of Science and Technology, Wuhan, 430074, China); Dr LI, Jiawei (Huazhong University of Science and Technology, Wuhan, 430074, China); Dr WANG, Pengyu (Huazhong University of Science and Technology, Wuhan, 430074, China)

Session Classification: Mon-Af-Po1.14 - Electrical Insulation for Magnets