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Thu-Mo-Po4.01-05 [4]: Research on Influence of High Pulse Magnet Fault on Power Supply and Protection Strategy

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High magnetic fields is a basic and indispensable research tool, which has been used in physics, medicine, biology, and other corresponding sciences as an extreme condition. Wuhan National High Magnetic Field Center has been working on the research of high pulsed magnetic field and designed the 100 Tesla system to achieve higher magnetic field. The magnet adopts a three-coil structure, which is powered by three sets of the power supply. The stress of the magnet is large and there is a large risk of damage when the magnetic field reaches a high level. In order to ensure the safe and stable operation of the power system, the influence on the power supply system is analyzed when a single short circuit fault and break down fault occur in magnets at different stages. A mathematical model is established to explain the change of the power supply circuit after the fault occurs. According to the mathematical model, the current and voltage changes of each coil under fault conditions are analyzed. Combined with the existing protection system, the protection strategy for high pulsed magnetic multi-power supply system is proposed. In this paper, the simulation results verify the accuracy of the analysis and control strategy.

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