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The Study of Pulsed Strong Magnetic Field Measurement System based on Distributed Magnetic Field Sensors

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Currently, how to measure the magnetic field accurately is a difficulty in the study of high magnetic field. This paper proposes a measurement method for pulsed magnetic field based on distributed magnetic field sensors. The method adopts multiple magnetic field sensors based on Rogowski coil to measure the value of the magnetic field. The magnetic field sensor is a single cube structure, of which three sides are closely linked and perpendicular to each other. The sensors are made up by the technology of printed circuit board. Each side is covered with copper, and then forms three little coils. Each coil induces magnetic field changes in the x, y, and z direction, respectively. The output of the coils reflects the value of magnetic field in correspondingly measured direction. Thus, the value of magnetic field of monitoring points can be obtained by comprehensively processing of the output of the three magnetic field sensors. After obtaining signals of the magnetic field sensors, this paper adopts a data analysis method based on subsection FFT with window functions to extract useful signal among the output signals of the sensors accurately. This paper will focus on the study of sensing mechanism and method of distributed magnetic field measurement. And then researches the disturbances of magnetic field measurements, by means of establishing model of magnetic field sensor in the simulation software, such as the temperature and humidity changes, the electric field etc. Besides, the corresponding data compensation algorithm to ensure the accuracy of measurement results will also be studied, and then the accuracy can be improved.

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