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Quench analysis and experiment of FECR prototype Nb3Sn superconducting magnet

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For future larger and higher energy particle accelerator, the Fourth superconducting electron cyclotron resonance ion source (FECR) is building in Institute of Modern Physics, Chinese Academy of Science. In order to verify the technology of the Nb¬3Sn superconducting magnet for FECR, a prototype which consists of two axis solenoid coils and six sextupole coils with cold iron yoke has been fabricated. A three-dimensional quench simulation of the magnet has been carried out in OPERA-quench and ANSYS, the quench process of the magnet without protection circuit and iron yoke is first performed and the protection circuit is designed based on the analysis result. Then the experiment had been carried by the protection circuit. Finally, the difference between simulation results and experiment is discussed.

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