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技术及应用

北京正负电子对撞机重大改造工程中超导磁体电流引线设计

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摘要 北京正负电子对撞机重大改造工程（BEPCⅡ）中超导聚焦四极磁体(SCQ)共有6对电流引线，输送4种不同大小的电流。超导探测器磁体(SSM)由1对4 000 A的电流引线输送电流。本文为SCQ和SSM两个超导磁体设计多层套管结构的电流引线。引线通过在低温端增加大质量铜座的方法来延长当冷却氦气消失时低温端温度上升到超导导线失超温度的时间。给出了多层套管结构电流引线稳态与非稳态大型CFD软件Fluent6.0 数值模拟结果。

关键词 北京正负电子对撞机重大改造工程 超导磁体 电流引线 CFD

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Design of Current Leads for Beijing Electron and Positron Collider Upgrade

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Abstract For Beijing Electron Positron Collider Upgrade (BEPCⅡ), six pairs of current leads with four different currents were used for superconducting quadruple magnets (SCQ) and a pair of 4 000 A current leads were used for the superconducting solenoid magnet (SSM).Multi-tube current leads for SCQ and SSM magnets were designed. The special feature of the leads is that a copper block is added to the cold end of the leads to delay the time for runaway in case of the cooling helium being interrupted. The numerical simulation results on steady and unsteady thermal processes by CFD software package Fluent6.0 are also presented.

Key words BEPCⅡ _ superconducting magnets _ current leads _ CFD

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