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Study on the performance of liquid helium re-liquefier for superconducting chip test

Thursday 25 July 2024 14:00 (2 hours)

A liquid helium re-liquefier system has been designed for superconducting chip test. The cold source of the system is a PT420 GM type Pulse tube cryocooler. On this base, the precooling structure and recondensation structure has been designed. Besides, composite magnetic shielding structure was used to ensure the chip working in an extremely low magnetic environment. With a special designed mechanical interface and PID control system, the chip could be replaced when the cryocooler is on. Experiment shows that the cooling time of the system is about 8h, and the cooling capacity is 1.15W, which could ensure the working of superconducting chip with hundreds of channels. Residual magnetism of the working chamber is below 5nT. Automatic control module could ensure the system working without people. In order to extend the holding time when unexpected power outage occurred, a special cooling capacity recovered structure has been added to the system to utilize the cooling capacity of the cold helium gas.

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