

by activated carbon in liquid nitrogen^[2], and the purity can be improved to 99.999% here. Table 1 is the experimental dates when the helium purification device was leave-factory checked and accepted. . It shows when the inlet purity is about 96.5%, the outlet purity can get to 99.999%.

References

[1] Li Zhun, Wang Hongjun, Wang Zezhang, et al. , Cryogenics & Superconductivity, 10(2012).
[2] Wan Xiaogang, Fu Jian, Zhao Linhua, Research on Application of Aerostat Helium Purification Method, 39, 4(2011).

6 - 8 Thermoanalysis of Thermal Shield in Test Cryomodule Project

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The test cryomodule is used to improve the experimental environment for superconducting equipments, which is the important part in linear accelerator system. In the cryomodule project, there has a thermal shield which is used to decrease the consumption of liquid helium. The thermal shield can reduce the radiation heat between room temperature and superconducting low temperature, and reduce the heat conduction of pipe system. It consists of copper wall and pipe, stainless steel support and rod. Because of low temperature and easy to be obtained, liquid nitrogen is used to cool down thermal shield in the test cryomodule. For optimal test cryomodule design, it's necessary to analysis the distribution of temperature in thermal shield.

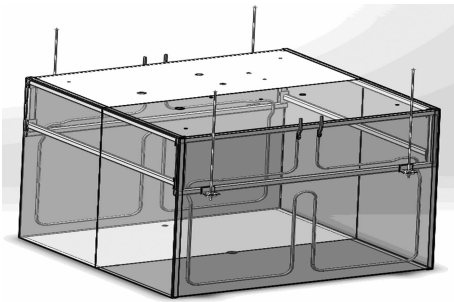


Fig. 1 The structure of thermal shield.

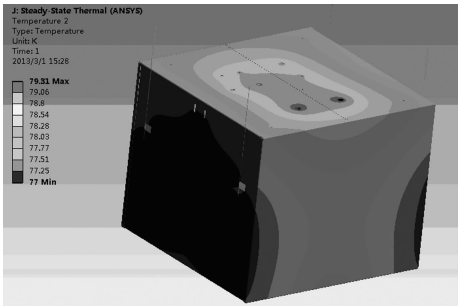


Fig. 2 The temperature distribution on the surface.

It adopts the thermal analysis software-ansys to get the result. The basic structure diagram of thermal shield shown in Figs. 1 and 2 reveals the temperature distribution. According to the overall design of the cryomodule, the initial conditions of thermal shield model include: the radiant heat flux between room temperature and the surface temperature of thermal shield 1.5 W/m², the intercepts of the pipe system in the cryomodule produce heat to the model, as well as the cooling circuit temperature is set 77 K. It can get the temperature difference on the model less than 5 K from Fig. 2, and in general, the temperature distribution is evenly. Based on the result, the structure design can meet cryomodule requirement in theory.

Reference

[1] Wang Li, Tang Hongming, Journal of Huazhong University of Science and Technology (Nature Science), 35, 2(2007).