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PULSE TUBE CRYOCOOLER SQUID COOLING SYSTEM INVOLVING AN INFRARED TENPERATURE CONTROLLER

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High Tc SQUID based NDE system is considered to be marketed. For the operation of such a system in a factory, liquid nitrogen-free-cryocooler is required because of the less daily maintenance. Recently, low noise pulse tube cryocooler has come on to the market. However, in the most of the system a resistive heater is employed for the temperature control. Since the current associated with the resistive heater causes magnetic noise, an alternative noise less method is desired. Although controlling a cooling medium of the refrigerator by adjusting a valve is one alternative method to control the temperature, it is hard to control precisely in a matter of minutes. We propose use of an infrared heat source for the temperature control system. In this paper we describe a pulse tube cryocooler SQUID cooling system, which temperature was controlled by an infrared source. The HTS SQUID magnetometer was mounted and cooled by a coaxial pulse tube cryocooler. A halogen lamp with a total reflection parabolic mirror was used as an infrared source. The light was guided by a quartz flexible bundle fiber with diameter of 10mm and was introduced to the cold head. The output power of the lamp was controlled by a LakeShore 331 temperature controller in accordance with the SQUID temperature. As a result, the flux noise of the SQUID output was not changed in the range of 1Hz to 1000Hz regardless of the lamp power. The temperature could be controlled at 77K with accuracy of 0.03K in a long time measurement more than 2 hours. This demonstrated that the system can be applied to the NDE system.