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Stabilized Pulse Tube Cryocooler System with Infrared Lamp Heater for SQUID Magnetic Sensor

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A pulse tube cryocooler superconducting quantum interference device (SQUID) cooling system, in which temperature was controlled by an infrared source**,** was proposed. A high-Tc SQUID magnetometer was mounted and cooled by a coaxial pulse tube cryocooler. A light from a halogen lamp was guided by a quartz flexible bundle fiber and was introduced to the cold head. The output power of the lamp was controlled by a temperature controller in accordance with the cold-stage temperature. As a result, the flux noise of the SQUID output was not changed in the range of 1 to 1000 Hz regardless of the lamp power. The temperature could be controlled at 77 K with an accuracy of 0.03 K ± for a long time duration of more than 2 h. This demonstrated that the system can be applied to any application such as non destructive evaluation (NDE) systems.

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