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## **C3Po1E-04: Design and testing of a tin superconducting heat switch for adiabatic demagnetization refrigerators**

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The superconducting heat switch is a critical component in an adiabatic demagnetization refrigerator (ADR) to achieve a temperature lower than 50 mK, and its switching performance significantly affects the overall efficiency of the ADR. We have designed a superconducting heat switch utilizing high-purity tin (99.99%) as the superconducting material, and have carried out experimental testing on its performance. The results show that the superconducting heat switch achieves full conduction under an applied magnetic field of 0.07 T. With a heat load of 100  $\mu$ W, the measured thermal resistance in the conducting state is 4542.25 K/W, while in the off-state, the thermal resistance is 10391.1 K/W, resulting in a switch ratio of 2.28. This heat switch is expected to be primarily used in temperature regions around 500 mK to manage the thermal connection between the ADR and the pre-cooling system.

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