Contribution ID: **194** Type: **Poster Presentation (120m)**

Experimental study of a single-stage adiabatic demagnetization refrigerator

Tuesday 23 July 2024 14:00 (2 hours)

The adiabatic demagnetization refrigerator (ADR), based on the principle of magnetocaloric effect, is a solid-state cooling device. One of its key advantages is the ability to operate under microgravity conditions while offering high thermodynamic efficiency and modular design. Moreover, it stands out as one of the few coolers capable of achieving sub-Kelvin temperatures. As a result, it is gaining significant attention in space applications requiring extremely low temperatures. This study presents the design and experimental performance of a single-stage adiabatic demagnetization refrigerator. The ADR incorporates a superfluid helium bath, providing a precooling temperature of approximately 1.2 K. The magnetocaloric material chosen for this setup is a paramagnetic salt (CPA). A superconducting magnet supplies a magnetic field of 2 T. Experimental measurements show that, under adiabatic conditions, this single-stage ADR can obtain a minimum temperature of 73.58 mK upon completely removing the magnetic field.

Submitters Country

CHINA

Author: ZHAO, Shubao (中国科学院理化技术研究所)

Co-authors: WEI, Lingjiao (中国科学院理化技术研究所); Mr WANG, Guopeng (中国科学院理化技术研究所); Mr PAN, Zijie; Mr LIANG, Jingtao (中国科学院理化技术研究所); Mr CHEN, Houlei (中国科学院理化技术研究所); Mr ZHAO, Miguang (中国科学院理化技术研究所)

Presenter: WEI, Lingjiao (中国科学院理化技术研究所)

Session Classification: Tue-Po-1.2

Track Classification: Tracks ICEC 29 Geneva 2024: ICEC 02: Cryocoolers, magnetic coolers and other coolers