Contribution ID: **174** Type: **Poster Presentation (120m)**

Optimizing of regenerator materials for a high-frequency pulse tube cryocooler working below 3 K

Tuesday 23 July 2024 14:00 (2 hours)

Limited by insufficient cold storage capacity of regenerator materials, especially operating below 10 K, it is challenging for a high-frequency pulse tube cryocooler to obtain a low temperature down to liquid helium temperature. In this study, the influence of different regenerator materials on the refrigeration performance of a high-frequency regenerator working in the liquid-hydrogen to liquid-helium temperature ranges was investigated primarily by detailed numerical simulation. Besides, the design and optimization direction of the low-temperature regenerator was outlined. Based on simulation results, a three-stage high-frequency pulse tube cryocooler with composite thermal-coupled and gas-coupled refrigeration process was designed, built, and tested. Using 4He as the working gas, a no-load temperature below 3 K was experimentally obtained, and a cooling power of around 20 mW at 4 K can be provided.

Submitters Country

CHINA

Authors: YANG, Biao (Technical Institute of Physics and Chemistry, Chinese Academy of Sciences); GAO, Zhaozhao; Dr CHEN, Liubiao; WANG, Junjie (Technical Institute of Physics and Chemistry, Chinese Academy of Sciences)

Presenter: YANG, Biao (Technical Institute of Physics and Chemistry, Chinese Academy of Sciences)

Session Classification: Tue-Po-1.2

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