

Theoretical and experimental study of a two-stage coaxial type Stirling pulse tube refrigerator

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The Stirling pulse tube refrigerator is regarded as one of the development directions of space refrigerators due to its advantages of no moving parts at the cold end, low vibration, light mass and long life. The Stirling pulse tube refrigerator in the liquid hydrogen temperature region, as the front refrigerator of the pulse tube refrigerator in the liquid helium temperature region, will have a direct impact on the cooling capacity and efficiency of the third-stage pulse tube refrigerator in the liquid hydrogen temperature region. In this context, this paper carries out theoretical and experimental research for the two-stage coaxial stirling pulse tube cooler in liquid hydrogen temperature region, and realizes the cooling capacity of 0.5W@30K with the input electric power of 400W, which lays the foundation for the next step of adding the third-stage pulse tube refrigerator to realize the temperature of liquid helium temperature region.

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