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## **Investigation of single stage high-efficiency stirling-type pulse tube cryocooler below 20K**

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High frequency pulse tube cryocooler has many advantages, including simple and compact structure, no moving components at cold head, low vibration and low noise. Thus it has become the widespread refrigeration equipment in aerospace field. But the temperature of single-stage pulse tube cryocooler is difficult to reach the temperature range of liquid hydrogen now. In order to reach the temperature range of liquid hydrogen and improve the efficiency of single stage high frequency pulse tube cryocooler, experimental research has been investigated on it in this paper, meanwhile, using the theoretical calculation software Sage to simulate the phase shifter about double-inlet, multi-bypass etc.. The research results will provide a distinct direction for improving the efficiency of the stirling-type pulse tube cryocooler below 20K.

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