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Influence of Regenerative Material on Performance of 6K Level High Frequency Pulse Tube Cryocooler

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As very low temperature high frequency pulse tube cryocooler has been a hot topic in the field of pulse tube cryocooler, improving the cryocooler's performance is a common goal of researchers. By integrating the former results, we found that regenerative material is a key factor for the improvement of pulse tube cryocooler's efficiency. In this paper, some experi-ments were conducted to find the regenerative material which is suitable for 7K, besides this, methods of simulation and experiment were used to investigate the influence of stacking style for performance of 7K high frequency pulse tube cryocooler. Finally, the lowest temperature has dropped from 8.8K to 6.7K and more than 10mW cooling power is able to be provided at 8K with a two-stage thermal-coupled high frequency pulse tube cryocooler used. The results of the cryocooler create a possibility of space application for terahertz detectors.

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