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C1Po1C-03 [03]: The Study on High Efficiency and Low Vibration Flexure Bearing Stirling Cryocooler

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In this paper, a high efficiency and low vibration stirling cryocooler has been designed and manufactured. The high efficiency compressor implementing the technology of dual opposed moving magnet motor and flexure bearing has been optimized to drive pneumatically a stirling cold finger also implementing flexure bearing technology. Through theoretical study and experimental study, the cryocooler can reach performance of 3W/80K under 60 WAC of electrical power. The vibration of compressor is suppressed by reducing the weights of moving-masses and controlling the process of assembling. The vibration suppression of the cold finger is implemented in terms of a mass-spring passive balancer. The vibrations of compressor and the cold finger could be decreased to below 5.6 mg and 1.9 mg respectively under the above solutions.

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