

## ***Design and Performance Test of Miniature Linear Stirling Cryocoolers***

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In order to meet continuous requirements of lighter weight, smaller size and lower power consumption for micro IR applications, miniature linear Stirling cryocoolers have recently been developed and manufactured in small batches at Lihan. The design specifications of the cryocoolers are also presented with numerical and engineering optimizations. The cryocoolers consist of two dual opposed linear moving magnets drive motors and a split Stirling cryocooler are expected to provide 0.5 W of cooling power at 80K with smallest size and lowest weight. The impact of stepped and rod-less displacer on system performance and size are numerically analyzed and experimentally tested. The experimental results show that the weight both of two cryocooler systems weight can be controlled below 300 grams. The experimental results also show that the cryocooler with stepped displacer could acquire 0.5W of cooling power at 80 K with 12 W of electric input power and the cryocooler with rod-less displacer could acquire similar cooling power but more electric power consumption.