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Experimental study on a 1.3 W@4.2 K GM type pulse tube cryocooler

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GM pulse tube cryocoolers with large cooling capacity at liquid helium temperature are widely used due to the advantages of low vibration, long life and high reliability in some fields, including quantum computing, condensed matter physics research and others. Our research team previously developed a cold head of the GM type pulse tube cryocooler based on the American compressor CPA1110, which achieved a minimum temperature of 3.1 K and can provide 0.8 W cooling capacity at 4.2 K. This paper focuses on the matching test and coupling research between this cold head and the domestic commercial compressors LAVROCK 60 and LAVROCK 100. Finally, the optimized GM type pulse tube cryocooler achieves a minimum temperature of 2.5 K and can simultaneously provide 1.3 W at 4.2 K and 20 W at 45 K.

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