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C2Or3A-03: Development of a 5 W/4.2 K two-stage pulse tube cryocooler

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Cryomech has been continuously improving the cooling capacities and energy efficiencies of its 4.2 K two-stage pulse tube cryocoolers. The 2.7 W at 4.2 K two-stage pulse tube cryocooler (Model PT425) was developed and introduced by Cryomech in 2021, which, at the time, was the largest, commercially available, 4 K pulse tube cryocooler. Our newest model, the PT450, has been successfully developed, providing a minimum of 5.0 W at 4.2 K on the 2nd stage with 65 W at 45 K on the 1st stage simultaneously, operating on either 60 or 50 Hz power. The PT450 answers the market's need for the continuing development of large cryogen-free dilution refrigerators, superconducting magnets, helium liquefiers and other applications requiring large cooling capacities at 4 K.
In addition, a new helium compressor (Cryomech CP3000-Series) has also been developed to provide sufficient helium flow for the PT450 and other large cooling capacity cryocoolers. This new model also allows multiple cryocoolers to operate on one compressor. The CP3000-Series is the largest commercially available helium compressor for the Gifford-McMahon and pulse tube cryocooler market.
The development of the PT450 cryocooler, its cooling performance and experimental results will be presented in this paper.

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