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## **Investigation on a High-Power Stirling Cryocooler working at 77 K**

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Stirling cryocoolers are promising in high temperature superconductivity application and small scale gas liquefaction, due to their high efficiency, wide operating temperature range and fast cool-down process. A high-power Stirling cryocooler driven by a crank-rod mechanism was studied systematically. A numerical model built upon Sage-software was used to show the detailed characteristics of mass flow, pressure oscillation, temperature profile along the regenerator, acoustic power distribution and enthalpy flow in the cryocooler. The cooling performance of the cryocooler was tested and analyzed under various operating conditions. A cooling power of 700 W at 77 K with an electrical input power of 11.2 kW has been achieved up to now. The comparison analysis between the simulation results and experimental results shows the direction for further design optimization of the high-power Stirling cryocooler.

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