

Investigation on multi-stage centrifugal cold compressors in superfluid helium cryogenic system

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The centrifugal cold compressors are the pressurizing device commonly used in large-capacity superfluid helium systems to connect the 2 K helium tank to the room-temperature screw compressors. In order to provide a large pressure ratio, the cold compressors are connected in the form of multi-stage series, which would result in the stable operating region that is reduced to a certain extent. Therefore, this paper models the multi-stage cold compressors and piping system, also decouples and analyses the system using different actuators to study the characteristics of the system under steady and dynamic load conditions, and uses bypass valves to regulate the compressor under surge conditions.

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