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C1Po1C-01: Analysis and optimization on heat leakage structure of cold compressor in large-scale refrigeration system

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Large-scale helium cryogenic refrigeration facilities are indispensable equipment for many cutting-edge researches, and the cold compressor is the most advantageous pressurization scheme in superfluid helium systems with capacity of more than 200 watts. Due to the extremely low operating temperature zone of the cold compressor, the efficiency of the compression process decreases as the external heat leakage increases, especially when building systems with greater cooling capacity, this phenomenon becomes more significant. In order to reduce the influence of heat leakage, a conjugate heat transfer analysis is carried out on the cold compressor using commercial CFD software, and the internal structures, including thermal anchor, thermal insulation materials, are analyzed and optimized base on the simulations.

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