

## ***Development of a Space Closed Loop Hybrid J-T Cooler below 2K***

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The hybrid J-T cooler is taking the place of super-flow helium cryostat due to its advantages of small size and weight and long life. A hybrid J-T cooler below 2K, composed of a  $^3\text{He}$  JT cooler precooled by a two-stage thermally coupled pulse tube cooler, is developed by our laboratory. The influence of charge pressure on the performance of the hybrid J-T cooler is experimentally tested. And the comparison of the heat transfer characteristics of  $^3\text{He}$  and  $^4\text{He}$  in counter-flow heat exchangers is presented. Besides, discussion of the difference between  $^3\text{He}$  J-T process and the  $^4\text{He}$  J-T process is demonstrated. Finally, temperature of below 1.8K is achieved when the total power consumption is lower than 280W.