

---

## **SESSION 9: Reverse Brayton & JT Coolers**

Paper 9.2 Wednesday POSTER Session 1:15 to 2:45 PM

---

### ***Design and Analysis of a Space 0.3W at 4.5K Hybrid J-T Cooler***

*Y. Ma, J. Quan, Z. Liu, J. Li, Y. Liu, J. Wang, Tech. Inst. of Physics and Chem. CAS, Beijing China; J. Liang, Univ. of CAS, Beijing, China*

The application of some infrared detectors in space requires a space cryocooler to provide a cooling capacity of over 100 milliwatts at liquid helium temperatures. The hybrid J-T cooler is taking the place of a super-flow helium cryostat due to its advantages of small size and weight and long life. A 0.3W at 4.5K hybrid J-T cooler is designed by our laboratory. The J-T cycle is precooled by a two-stage high-frequency pulse tube cooler, which is able to provide cooling power at 80K and 20K. The influence of charge pressure, precooling temperature and efficiency of the counter-flow heat exchangers on the performance of the hybrid J-T cooler is discussed in detail. Additionally, the main challenges in developing the 0.3W at 4.5K J-T cooler are presented in this paper.