



Contribution ID: 736

Type: **Poster Presentation**

C1Po2D-04 [08]: Asymmetric Research on Multi-bypass for Pulse Tube Cryocooler

Monday, July 22, 2019 2:00 PM (2 hours)

The multi-bypass is one of the effective ways to reduce the lowest no-load temperature of pulse tube cryocooler. The common structure of multi-bypass is to use a thin tube to connect the middle of the pulse tube to the middle of the regenerator which can reduce the mass flow through the regenerator and adjust the phase angle of the cold end for the refrigerator, which effectively reducing the lowest no-load temperature of the cryocooler. Actually, the multi-bypass is as asymmetric as double-inlet structure. In this paper, a new type of asymmetric multi-bypass structure has been proposed, which makes the working gas has different resistance when entering and leaving the regenerator. The multi-bypass structure is simulated by Sage software, based on a 0.5W@20K pulse tube cryocooler model. The influence of different structures on the lowest no-load temperature of the pulse tube cryocooler have been discussed and some rules have been summarized simultaneously.

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Session Classification: C1Po2D - Heat Exchangers