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C1Po1C-05 [01]: Numerical investigation on geometry's influence in double stage Vuilleumier type pulse tube cryocooler (VM-DPTC)

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The double stage Vuilleumier type pulse tube cryocooler (VM-DPTC) is a novel kind of 4K-class pulse tube cryocooler driven by thermal compressor. Besides its compact size and low-frequency working pattern eliminating the moving parts in cryogenic temperature ($<77\text{K}$) will improve the working stability and reduce the inherited losses. To design a proper 4K double stage pulse tube cryocooler under a certain thermal compressor, a numerical model based on Sage 10 software is established. The geometry of the pulse tube cryocooler especially the influence of different combination of two stage's length on the no-load temperature and cooling power at 4.2K are studied. The numerical results shows that the second stage length should be longer than the first stage length to prevent the better performance of the VM-DPTC.

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