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Vibration Isolation for a Pulse-Tube Research Cryostat[1] S.T.P. BOYD, University of New Mexico — Commercial pulse-tube refrigerators (PTRs) now provide base temperatures < 3K, low vibration, and long life. However, vibration levels are still often too large for LT and ULT measurements. One highly successful approach to vibration isolation in very small cryostats has been the use of 1-atm He exchange gas, in an envelope with a flexible element, interposed between the cold head and the cryostat. A design study to scale up this technique for a PTR research cryostat has previously been presented. However, some questions remained, given the violation of "adiabaticity" of the "pulse tubes" in the PTR and the potential for convective flow and Taconis oscillations of the exchange gas in the open geometry. We present experimental results obtained on the cryostat with a rigid exchange-gas volume, which permitted the variation of exchange-gas pressure. The news is all good so far: the heat exchangers perform well and in reasonable agreement with calculations, no evidence is seen of deleterious effects due to convection or Taconis oscillations or gas permeation, and the 2.8K PTR base temperature is only raised by 0.1K or less. Work to implement the fully-vibration-isolated cryostat is now underway.

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S.T.P. Boyd
University of New Mexico

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