Exchange Gas Vibration Isolation for a “Dry” Research Cryostat

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Exchange-Gas Vibration Isolation for a “Dry” Research Cryostat

STP Boyd and A Pregenzer-Wenzler

Abstract. Thermal contact to a mechanical refrigerator via 1-atm helium exchange gas provides the best known vibration floor for dry cryostats. We describe initial performance measurements of a new cryostat designed to implement this approach.

Thermal Performance with 1-Atm $^4$He Exchange Gas

- Heat exchangers are performing well at 1 atmosphere
- Data in agreement with heat-transfer calculations
- No indication of degradation of pulse-tube refrigerator performance when surrounded by 1 atm $^4$He
  - No Taconis oscillations or convection rolls!
  - No impact from $^4$He heat capacity in contact with “pulse tube”!

Preliminary Vibration Measurements

- Mechanical Decoupling Verified with Ohmmeter
- Remaining Coupling is through tripod legs, will be addressed in next stage of construction