

Rigid ADR Suspension

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Insulating fiber suspensions are commonly used in adiabatic demagnetization refrigerators to position paramagnetic salt pills into the bore of a superconducting high field magnet. Minimizing conducted heat flow from higher temperature levels to the coldest stages of the ADR is key to achieving useful hold times for target regulation temperatures below 100 mK. However, conducted heat flow is only one component of the total heat energy input to the adiabatic cooling system. For systems which are installed in high vibration environments, the heat generation which occurs from physical oscillations of the paramagnetic salt pill through the magnetic field results in major contributions to the total heat dissipation. The design and construction of a rigid suspension spider system which provides a first harmonic response above 400 Hz while insulating a 70 mK salt pill with a characterized parasitic heat leak of 1.2 μW is described in this paper.