

## ***High Performance Thermal Straps for a Full Range of Application Temperatures***

***M. Ralphs, M. Sinfield, and M. Felt, Space Dynamics Lab,  
Logan, UT***

Thermal straps are an essential component when using vibration sensitive instruments and cryocoolers in close proximity. Thermal straps conduct heat from the instrument to the cryocooler while limiting the amount of mechanical vibration the cryocooler transfers back to the instrument. Thermal straps are made from flexible, thermally conductive materials. Traditionally, they are made of metal – aluminum or copper, mostly – that has been formed into thin foils, wires, or braids to provide greater flexibility while still providing satisfactory thermal conductivity. These metallic straps provide superior thermal performance at cryogenic temperatures ( $< 50$  K) where their thermal conductivities peak to extraordinary levels. Pyrolytic Graphite Sheet (PGS) thermal straps have a thermal conductance that peaks at higher temperatures – 160 K – and provide much higher mass-specific thermal conductance at temperatures above 60 K. This paper discusses the pros and cons of aluminum, copper, and PGS thermal straps along with various techniques to model and test their thermal performance.