
SESSION 12: Aerospace Coolers, Drive & Control Electronics

Paper 12.2

Wednesday ORAL Session

3:00 PM

Split Multi-Stage Pulse Tube Cryocooler Cold Head for Remote Cooling

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Lockheed Martin Space is the industry leader in simple multi-stage long-life pulse tube cryocoolers for cooling to very low temperatures. All past Lockheed Martin cryocoolers have used a single cold head integrating all the stages of the pulse tube cryocooler into a single piece of hardware. Some cryogenic missions benefit from locating the cryocooler compressor remotely from the cold head, for example to reduce exported vibration from the compressor affecting the cryogenic instrument. However, in some of these cases, such as the MIRI instrument on the NASA James Webb Space Telescope, there is a remote cryogenic portion of the instrument which disallows warm portions of the cryocooler cold head from being co-located with the cryogenic instrument.

Lockheed Martin Space has developed a new “split cold head” configuration which allows a simple multi-stage pulse tube cryocooler to meet the requirements of some remote cooling applications. Results of successful modeling and testing of this concept will be presented in this paper.