



Contribution ID: 1063

Type: **Contributed Oral Presentation**

M3Or2B-04: A Study of the Individual Contributions of Heat Generated by a XRISM/Resolve ADR Stage Magnet and its Magnetic Shielding

Wednesday, July 24, 2019 12:15 PM (15 minutes)

A typical Adiabatic Demagnetization Refrigerator (ADR) has modest cooling power, on the order of a few microwatts. Thus, understanding heat loads going into and generated within the ADR is vital to its efficiency as well as the efficiency of the total cryogenic system of a spacecraft. One of the many sources of heat that effects the total cryogenic system is the parasitic heat due to AC loss in the ADR magnet and hysteretic loss in its magnetic shielding during a ramp. Although the sum of the heat from both of these sources can be measured during the operation of the ADR, the individual contributions are not easily obtainable in situ. Therefore, a study is being conducted to experimentally measure the contributions of the parasitic heat produced during ramping from the magnet only and from the magnet-shield combo. This study will give better inputs to the heat load model of the total cryogenic system being built for the X-Ray Imaging and Spectroscopy Mission (XRISM) slated to launch in 2022.

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Session Classification: M3Or2B - AC Loss YBCO