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[Invited Oral] Performance Testing of the Flight Model Astro-H 3-stage ADR

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The Soft X-ray Spectrometer (SXS) is one of four instruments that will be flown on the Japanese Astro-H satellite, planned for launch in late 2015/early 2016. The SXS will perform imaging spectroscopy in the soft x-ray band using a 6x6 array of silicon microcalorimeters operated at 50 mK, cooled by an adiabatic demagnetization refrigerator (ADR). NASA/GSFC is providing the detector array and ADR, and Sumitomo Heavy Industries, Inc. is providing the remainder of the cryogenic system (superfluid helium dewar (<1.3 K), Stirling cryocoolers and a 4.5 K Joule-Thomson (JT) cryocooler). The ADR is unique in that it is designed to use both the liquid helium and the JT cryocooler as its heat sink. The flight detector and ADR assembly have successfully undergone vibration and performance testing at GSFC, and are currently being prepared for shipment to Japan for integration in the flight dewar. This paper presents test results of the flight ADR in both "with cryogen" and "cryogen-free" operating modes.

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