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A thermally-conductive electrical isolator for use at ultra-low temperatures in the Astro-H Adiabatic Demagnetization Refrigerator

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The Soft X-ray Spectrometer (SXS) destined for the Japanese Astro-H mission contains a 6x6 array of microcalorimeters. To achieve ultimate resolution the array must be electrically isolated from the rest of the instrument as well as cooled to 0.050 K. The latter is achieved by directly coupling it to the coldest stage of a multi-stage Adiabatic Demagnetization Refrigerator (ADR). Thus, the electrical isolation is in-line with a portion of the cooling chain demanding the dielectric be thermally conductive at sub-Kelvin temperatures. We present here the design that balances electrical isolation with reasonable thermal conductance below 1 Kelvin.

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