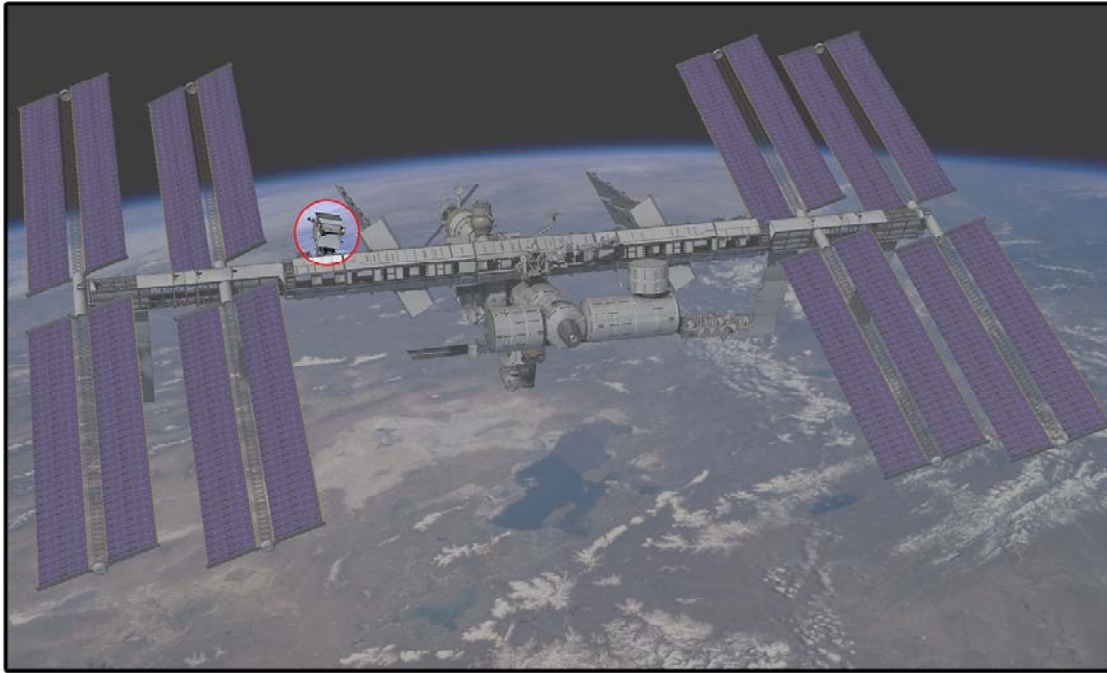


An experiment to search in space for dark matter, missing matter & antimatter kept safe with CTD Insulation



CTD CryoCoat™ UL-79 is an essential insulation component on AMS-02 (Alpha Magnetic Spectrometer), a state-of-the-art particle physics detector being constructed, tested and operated by an international team organized under United States Department of Energy (DOE) sponsorship. AMS-02 is manifested on Shuttle Flight STS-134, scheduled to launch July 29, 2010, for installation on the International Space Station – one of the last ever NASA Space Shuttle missions.

Risk Reduction

The large cryogenic vessel, storing liquefied helium, of the AMS-02 is a potential safety hazard when in the enclosed payload bay of the Space Shuttle and during ground handling. If the insulating vacuum case is punctured, air could rush through the gap and condense on the extremely cold surface of the helium vessel resulting in rapid pressurization and venting of the helium. To slow down the venting, CTD's CryoCoat UL79 is applied to the outside surface of the vessel. Carefully constructed experiments have shown that this insulation reduces heat flux to the liquefied helium by a factor of 8 following a puncture of the vacuum case.

Due to its robustness and compatibility with vacuum, CTD's CryoCoat UL79 was chosen as the thermal insulation system for this purpose. The layered insulation system consists of the high strain adhesive CryoBond™ 920 and the modified syntactic foam-based insulation, CryoCoat UL79. This insulation system was designed specifically for cryogenic applications to replace the traditional (less reliable) insulation systems such as foamglass or urethane foam. It has been thoroughly tested at cryogenic temperatures and have demonstrated exceptional mechanical properties over a wide range of temperatures, particularly for materials of such low density and ease of fabrication.

For this application a specialized process was developed by CTD to produce the insulation in conformable square tiles, 3 mm thick, enabling them to be formed, in situ, to the complex curvature of the helium vessel. Once formed, these tiles become rigid at room temperature after approximately 24 hours. Utilization of this unique insulation reduced safety concerns regarding the launch of the AMS-02 and will help to ensure a successful experiment to increase our understanding of the origin and structure of the Universe.

CTD is focused on developing and putting into the market next generation products and technologies using our unique materials, engineering expertise, and creative manufacturing processes. The fusion of this expertise enables CTD to incorporate our novel capabilities into useful products that provide a competitive edge for our customers.