Contribution ID: **106** Type: **Contributed Oral**

C1Or2B-04: Parasitic Heat Load Reduction of Cryocoolers

Monday 19 May 2025 12:00 (15 minutes)

With the further advance of cryogenic technology and high helium cost, more cryogenic environments are designed to be hermetically "sealed", requiring a detailed understanding and analysis of parasitic heat fluxes crossing into a cryogenic environment. A thermal balance sheet therefore includes operational states but also needs to cover outages.
One of the frequently underestimated heat sources crossing the cryogenic boundary is a non-operating cryocooler attached to a cold mass. Once a cryocooler turns into a non-operating state, the cryocooler housing consisting of several stainless-steel tubes with internally stacked regenerator material creates a small, but steady parasitic heat conduction path to the cold mass.
Inclined, non-operating cryocoolers, however, follow the theory of inclined cryogenic tubes and operating inclined pulse tube coolers, delivering an excess heat flux to the cold mass that by a far exceeds any conductive thermal loads.
In this research paper we exemplary determine the dominating parasitic convective heat flux created by non-operating GM-type cryocoolers. Moreover, we propose a simple process for shutting down this convective flow that is applicable for all types of non-operating cryocoolers, based on experimental results.

Author: Mr STAUTNER, Wolfgang (GE HealthCare –Technology & Innovation Center (HTIC))

Co-authors: SONI, Vijay (GE HealthCare Technology & Innovation Center, Niskayuna, NY USA); WU, Anbo

Presenter: Mr STAUTNER, Wolfgang (GE HealthCare –Technology & Innovation Center (HTIC))

Session Classification: C1Or2B - Non-Aerospace Cryocoolers II