

Cryogenic coolers are defined to make cold at a specific cold point. Typically this cold is generated inside the gas (i.e. Stirling and Pulse tube coolers) or the evaporating liquid (JT coolers). The heat and mass transfer inside the cooler and especially at the production of the cold is vital because an optimal heat transfer is of utmost importance to achieve optimal cooling power.

In the presentation, the heat and mass transfer challenges inside a cryocooler designed and manufactured to cool a high purity germanium sensor connected to an X-ray Microscope will be discussed in detail.

Also, the impact of the quality of the thermal connection between the cold tip of a cryocooler and a device to be cooled will be discussed. Simulations made with the nodal software ThermXL will be shown. This software could be used for various thermal simulations and has proven to be a useful tool for Thales Cryogenics to predict the function of their coolers in multiple environments.