

# Thermal Field in a NMR Cryostat

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## Abstract

Fundamental component of the NMR tomograph is the magnet. By using the property of superconductivity it is possible to achieve an induction field extremely homogeneous, stable and high. To maintain the material below the superconducting critical temperature (7.2K), the coils are immersed in liquid helium at 4K, within a cryostat. In this paper, we present the preliminary results related to the description of the temperature field and heat transfer phenomena inside the cryostat, obtained by finite element numerical simulations performed in Comsol Multiphysics®.

The simulations concern simplified three-dimensional geometries obtained from field inspections and construction schemes; sizes and materials actually used and all modes of heat transfer are taken in account. Some configurations of thermal insulation are discussed and boundary conditions are studied able to simulate the effect of a "cold head" placed in contact with a very limited portion of the cryo-shields.