

## **Development and Validation of Thermal Stability in Complex System ABDM has two ASIC by NISA and COMSOL Tools**

**Authors :** A. Oukaira, A. Lakhssassi, O. Ettahri

**Abstract :** To make a good thermal management in an ABDM (Adapter Board Detector Module) card, we must first control temperature and its gradient from the first step in the design of integrated circuits ASIC of our complex system. In this paper, our main goal is to develop and validate the thermal stability in order to get an idea of the flow of heat around the ASIC in transient and thus address the thermal issues for integrated circuits at the ABDM card. However, we need heat sources simulations for ABDM card to establish its thermal mapping. This led us to perform simulations at each ASIC that will allow us to understand the thermal ABDM map and find real solutions for each one of our complex system that contains 36 ABDM map, taking into account the different layers around ASIC. To do a transient simulation under NISA, we had to build a function of power modulation in time TIMEAMP. The maximum power generated in the ASIC is 0.6 W. We divided the power uniformly in the volume of the ASIC. This power was applied for 5 seconds to visualize the evolution and distribution of heat around the ASIC. The DBC (Dirichlet Boundary conditions) method was applied around the ABDM at 25°C and just after these simulations in NISA tool we will validate them by COMSOL tool, wich is a numerical calculation software for a modular finite element for modeling a wide variety of physical phenomena characterizing a real problem. It will also be a design tool with its ability to handle 3D geometries for complex systems.

**Keywords :** ABDM, APD, thermal mapping, complex system

**Conference Title :** ICFMHTT 2016 : International Conference on Fluid Mechanics, Heat Transfer and Thermodynamics

**Conference Location :** Toronto, Canada

**Conference Dates :** June 13-14, 2016