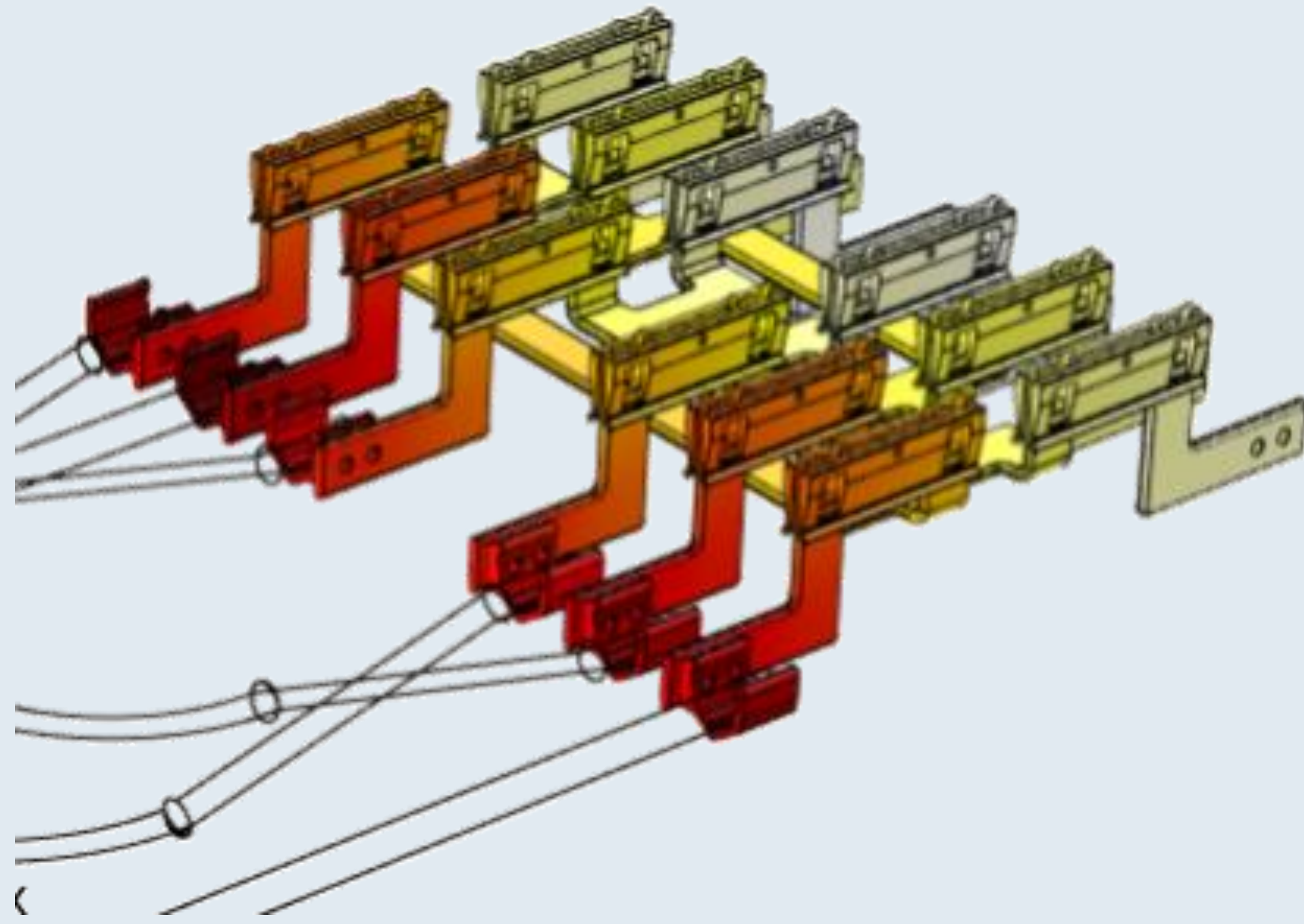


# FEA-Based Analysis of 4-Way Link Box Assembly Temperature and Recommendations for Improvement

Analyze and optimize the temperature in 4-Way Link Box Assembly

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## Abstract

This study presents the simulation results of a 4-way link box assembly to understand the temperature related issues. The primary objective was to measure the maximum temperature within the assembly, with a focus on the Complete Assembly, UET, Copper Busbar, and Wedge Link Busbar. The findings reveal that the highest temperature with subsequent heat transfer.

To address the elevated temperatures and enhance the thermal performance of the assembly. These recommendations were derived through the utilization of COMSOL Multiphysics. Implementing these suggested modifications can significantly reduce the temperature of the 4-way link box assembly, thereby ensuring its optimal performance.

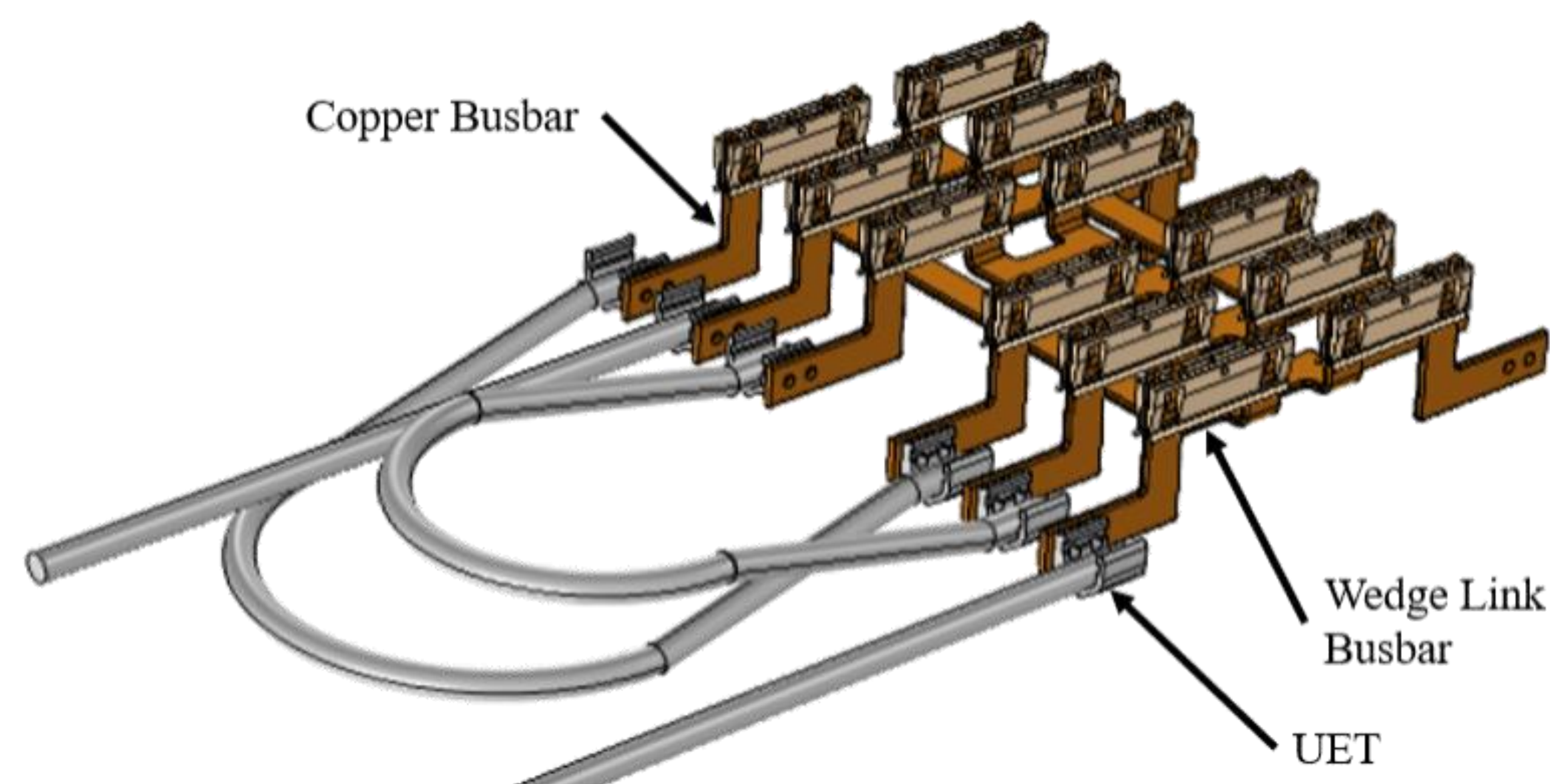


Figure 1. 4-Way Link Box Assembly Components

## Methodology

- A thermal analysis of the assembly was performed using COMSOL Multiphysics software. The geometry of the assembly was imported and material properties for the components, were defined.
- The simulation was configured to solve the heat equation and the boundary conditions were defined. The simulation was run until the temperature distribution in the assembly reached a steady state.
- The simulation results were analyzed to identify the hotspots in the assembly.

## Results

The thermal analysis using COMSOL Multiphysics revealed significant insights. The primary focus was on identifying areas with elevated temperatures.

- The highest temperatures within the assembly were consistently observed.
- The temperature distribution map indicating the hotspots, exceeding safe operational limits.

Critical areas with high temperatures were around the UET, especially at the cable-UET interface.

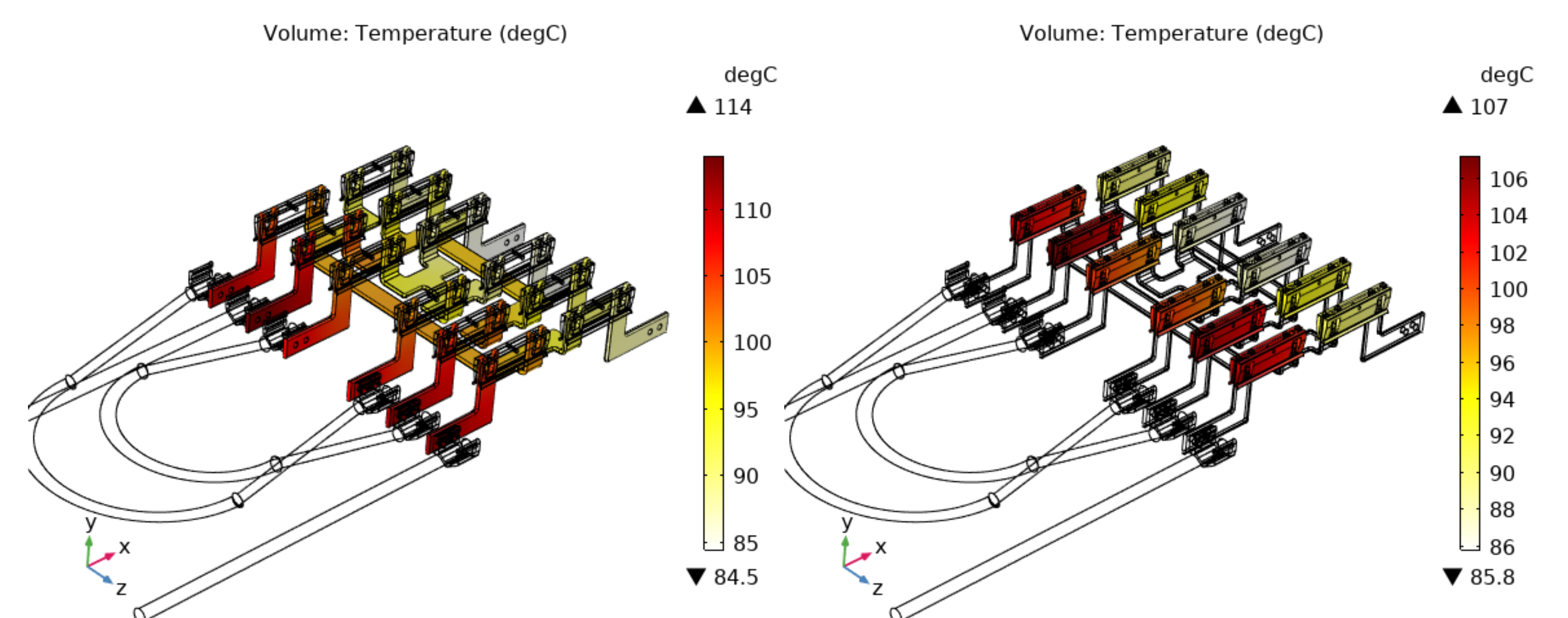


Figure 2. Left: Copper Busbar Heat Cycle Right: Wedge Link Busbar Heat Cycle

## REFERENCES

[1] Smith, J. A., and Johnson, R. B., "Thermal Analysis and Optimization of a 4-Way Link Box Assembly", in Journal of Electrical Engineering, 2023.

[2] Anderson and C. D., "Advances in Electrical Assembly Thermal Management", International Journal of Engineering and Technology, 2023.