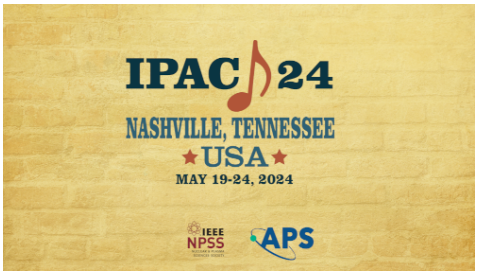

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Production and validation of the RF cooling damper for the LHC injection kickers

Tuesday, 21 May 2024 16:00 (2 hours)

Fast single-turn injection kicker systems deflect incoming beam onto the orbit of the LHC. The higher intensities of High Luminosity (HL) LHC beams are predicted to cause the ferrite yokes of the LHC injection kicker magnets (MKI), in their current configuration, to heat up to their Curie temperature. Studies to reduce the beam induced heating have been carried out over the past years and resulted in a design featuring a water-cooled RF damper. A significant portion of the beam induced power has been relocated from the yoke to a ferrite in the RF damper. The ferrite damper is cooled via a copper sleeve, brazed to the ferrite, via a set of water pipes. The manufacturing of this RF damper system is challenging since different materials are brazed together to form a complex and fragile assembly, optimized for heat transfer, installed in an ultra-high vacuum environment. This paper outlines fabrication methods and their reproducibility, compares the results of measurements of the thermal interface between the ferrite and copper sleeve, and concludes on the challenges of assuring a production technique that results in a reliable and suitable thermal interface.

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