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NSTX-U IN-VESSEL CONTROL COILS DESIGN CONCEPT

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A successful conceptual design was completed to develop in-vessel control coils (a.k.a. Non-Axisymmetric Control Coils or NCC). The NCC coils are a series of saddle coils that are intended to satisfy a number of physics criterion including magnetic breaking, error field control, fast Resistive Wall Mode (RWM) control and ELM stabilization. Customized Mineral Insulated Cable (MIC) was selected for the conductor material. The MIC was made from oxygen-free copper conductor, high purity Magnesium Oxide powder insulation and 304 stainless steel sleeve cover. Sample MIC was purchased from an outside supplier and various tests conducted for design and performance verification including high voltage testing, which necessitated the development of special test terminations. A concept design was also developed for terminating the MIC ends using non-conductive and vacuum sealed technique. Two alternative designs were proposed for joints inside the vacuum vessel. The NCC Coils are designed to be mounted in-front of the primary passive plates and underneath the PFC tiles. The passive plates will be modified to accommodate the coils. A new PFC tiles design concept was developed using High-Z materials. New penetrations design on the vacuum vessel wall was developed to prepare one port per coil. A new power patch panel will be required to provide the ability for various combinations of connections between the NCC, the existing RWM Coils and the existing SPA power suppliers.

Eligible for student paper award?

No

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