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Design of Ground Plane of NSTX-U Ohmic Heating Coil

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A ground plane is a conductive, grounded, electrostatic shield surrounding high voltage insulated conductors. The purpose is to contain the electric field developed by the high voltage conductors within the insulation and to provide a return path for capacitive currents during transients.

A resistive paint was applied to the outer surfaces of the NSTX-U OH coil to form an outer ground plane. It serves to shield the surrounding instrumentation (flux loops, thermocouples, etc.) from electrical noise generated by the switching of the thyristor converters that supply power to the OH coil.

This paper provides a detailed description of the equivalent circuit model of the multi-layered OH coil with the ground plane. An analysis of surface voltage of the OH coil is performed using the PSCAD, a professional transient simulation tool, to confirm that the ground plane performs as required under normal operation and fault conditions. This work is supported by US DOE Contract No. DE-AC02-09CH11466.

Eligible for student paper award?

No

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