3rd Workshop on Calibration of ITER Neutron Diagnostics

The ITER Radial Neutron Camera: MCNP modeling and integration

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The Radial Neutron Camera (RNC) is a diagnostic located in ITER Equatorial Port #1 (EP01) providing several spatial and time-resolved parameters for fusion power estimation, plasma control and physics studies. The RNC measures the uncollided 14 MeV and 2.5 MeV neutrons from deuterium-tritium (DT) and deuterium-deuterium (DD) fusion reactions through an array of neutron flux detectors located in collimated Lines of Sight.

The design development of the diagnostic system relies on specific nuclear analyses conducted by means of the Monte Carlo MCNP code for of 3D particle transport calculations. Detailed models of the RNC subcomponents have been generated on the basis of the corresponding engineering CAD geometries and successively integrated in an updated version of the ITER C-model provided by the Port Integrator. Such model includes all the main features of the EP01 as well as the description of the components hosted in the Port Interspace and Port Cell.

An overview of the MCNP modeling and integration procedure is herein provided.