

Optimization of the Layout of the CYCLE ITER Antenna Port Plug and its Performance Assessment*

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An important aspect for maximizing the performance of the proposed CYCLE ITER Antenna (CIA), aside from the layout of the array front face, is the correct shaping of the RF surfaces in the port plug assembly. Indeed the shapes and RF characteristics of the 4-Port junction, Vacuum Window and Service Stub will determine the Voltage Standing Waves, hence maximum voltages, in the various sections transmitting the RF power from the Main Transmission Line ports at the back of the port plug to the 24 straps fed in triplets facing the plasma.

The paper will describe the optimization process starting from the 24x24 strap array impedance matrix obtained with Topica, discuss the various limitations and give a close to final assessment of the expected RF power coupling capabilities of the CIA.

Limitations such as electric fields in torus as well as private vacuum areas, maximum system voltages, and RF currents in contacts as well as manufacturing and cooling constraints have been considered during the optimization process.

Finally, the optimized layout has allowed assessment of the expected performance of the CIA as function of array phasing for SOL plasma profiles provided by IO.

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