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P2.022 Initial port integration concept for EC and NB systems in EU DEMO tokamak

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The integration of heating current drive (HCD) systems in the EU DEMO tokamak must address a number of issues, namely space constraints in the tokamak building, remote handling requirements, breeding blanket penetration, neutron and photon radiation shielding, compliance of penetrations of the primary vacuum with safety and vacuum criteria, and a large number of loading conditions, in particular heat, electromagnetic (EM), and pressure loads in normal and off-normal conditions. A number of pre-conceptual design options of the vacuum vessel (VV) port and the port-plug are under assessment and need to be verified against all requirements and related criteria.

The identification of the functional (or physics) requirements of the HCD systems remains an ongoing process during the pre-conceptual design phase, hence some initial assumptions had to be made as a basis for development of the design of the vacuum vessel ports and the HCD port plugs.

The paper will provide an overview of present margins in the functional/physics requirements and the rationale behind the assumptions made in order to allow development of the pre-conceptual design options. Furthermore it will introduce the initial design concepts of the Electron Cyclotron (EC) Launchers and the Neutral Beam (NB) Injectors integrated in the equatorial ports. The NB duct design in DEMO and related issues such as transmission and re-ionization losses will be also addressed.

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