

21st joint workshop on electron cyclotron emission (ECE) and electron cyclotron resonance heating (ECRH)

Contribution ID: 116

Type: **Poster**

Refinement of the EC stray radiation estimates for ITER

Thursday, 23 June 2022 14:00 (2h 30m)

The ITER ECRH&CD system is composed by 24 gyrotrons at 170 GHz that will deliver 20 MW at the plasma. Up to 6.7 MW will be injected in the empty vacuum vessel at the beginning of each plasma discharge to provide the gas breakdown. In that phase and when the plasma absorption is non ideal a certain level of EC non-absorbed power, usually addressed as stray radiation, will be present. The EC stray radiation interaction with ITER first wall and diagnostics has been described in a preliminary work (Gandini et al., 19th Topical Conference on Radio Frequency Power in Plasmas). A more refined assessment is here described, following update of the diffuse stray radiation model and update of the launchers optics parameters. The optical design of the EC equatorial launcher has been entirely redesigned to optimise the power deposition and minimise interaction with the launcher structures. The updated parameters for the 24 launched beams are now available and have been used to estimate the interaction of the beams to be used for the breakdown phase with the tokamak structures. The preliminary stray radiation model described every opening of the tokamak as a “black” hole, that is a perfect power sink. Refining this crude description using for some of the aperture a “grey” hole model provided a better agreement with benchmarks from other alternative models. Examples of stray radiation estimates performed for various ITER structures, systems and diagnostics are discussed.

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Session Classification: Poster Session 2