

P4.1089 An analysis of the ECRF stray radiation in JT-60SA

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See the full abstract here:

<http://ocs.ciemat.es/EPS2019ABS/pdf/P4.1089.pdf>

The JT-60SA large superconducting tokamak being built under the Broader Approach agreement jointly by Europe and Japan [1] will start operation in 2020. It is designed to address many areas of fusion science in preparation of the burning plasma era of ITER and DEMO, in particular the ones related with the control of high β steady state plasmas and the confinement of high energy particles. A key tool in the machine will be the 7 MW, 9 gyrotrons ECRF system which, as for the 34 MW NBI system, will be available in the Integrated Research Phase. Up to 1.5 MW of ECRF power will be available during the Integrated Commissioning without beam steering capabilities, while the system will be upgraded to 3 MW power with wide steering capabilities [2] in the Initial Research Phase. The ECRF system will support several applications since the plasma commissioning phase namely assisted start-up, EC wall conditioning, bulk heating and later on current drive and magneto-hydrodynamic instabilities control. In order to allow the needed flexibility the ECRF system will operate at three different frequencies, 82 GHz, 110 GHz and 138 GHz. An analysis of the residual non-absorbed ECRF power fraction expected in the various applications and plasma scenarios is presented in this contribution, studying its dependence on the steering angle and on the plasma main parameters such temperature and density. Both transient conditions, such plasma start-up, and flat-top scenarios are taken into consideration. Moreover, the expected stray power density distribution in the vessel and particularly around the potentially critical areas such diagnostics windows or pumping ducts is evaluated.

[1] JT-60SA Research Unit, JT-60SA Research Plan, Version 4.0, September 2018, http://www.jt60sa.org/pdfs/JT-60SA_Res_Plan.pdf

[2] T. Kobayashi et al., Fusion Eng. and Des, 96-97, Pages 503 (2015)

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