

Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

ITER ECRH protection: Microwave stray radiation exposure of in-vessel components¹ JOHAN WILLEM OOSTERBEEK, MATHIAS STERN, MATTHIAS HIRSCH, HEINRICH LAQUA, STEFAN MARSEN, FRANK NOKE, TORSTEN STANGE, ROBERT WOLF, Max Planck Institute for Plasma Physics, W7-X TEAM — At ITER, for first operation 24 gyrotrons at 170 GHz with 1 MW power each are being prepared for ECRH and ECCD. Using the O1 heating scheme, absorption of the injected power is full. But practical limitations in relaying and launching the power will lead to a fraction of non-absorbed power. This power is incident on in-vessel component, risking excessive heating. At Wendelstein 7-X (W7-X), with ten gyrotrons at 140 GHz with up to 1 MW each, this problem was also anticipated and a microwave stray radiation test facility was built to test in-vessel components at isotropic power densities of up to 50 kW/m² for up to 30 minutes. The facility is also operated in support of the ITER ECRH protection, for instance, exposing the Mirnov coil covers and future ITER proto type vacuum windows. The temperature increase, as well as the rate of temperature increase, of ceramics are measured as function of power density and exposure time. Various shielding concepts using metal foils, meshes and reflecting coatings are being assessed. Results are discussed in this contribution.

¹This work has been carried out within the framework of the EUROfusion Consortium and has received funding from the Euratom research and training programme 2014-2018 and 2019-2020 under grant agreement No 633053. The views and opinions expressed herein do not necessarily reflect those of the European Commission.

Johan Willem Oosterbeek
Max Planck Institute for Plasma Physics

Date submitted: 26 Jun 2020

Electronic form version 1.4