

COMMISSIONING OF THE PLASMA-WALL EXPERIMENT MAGNUM-PSI

J. Scholten¹, P.H.M. Smeets¹, S. Brons¹, H.J.N. van Eck¹, R.S. Al¹,
M.A. van den Berg¹, A.W. Kleyn^{1,2}, O.G. Kruyt¹, A.R. Lof¹,
H.J. van der Meiden¹, M.J. van de Pol¹, J. Rapp¹, G.J. van Rooij¹,
B. Schweer³ and P.A. Zeijlmans van Emmichoven¹

¹ FOM-Institute for Plasma Physics Rijnhuizen, Association EURATOM-FOM,
Trilateral Euregio Cluster, www.rijnh.nl

² Leiden Institute of Chemistry, Leiden University, The Netherlands, wwwchem.leidenuniv.nl

³ Forschungszentrum Juelich GmbH, IEF-4, Euratom association,
Trilateral Euregio Cluster, 52425 Juelich, Germany.

Corresponding author: scholten@rijnhuizen.nl

The FOM-Institute for Plasma Physics Rijnhuizen is constructing Magnum-PSI; a magnetized (3 T), steady-state, large area (80 cm²) high-flux (up to 10²⁴ H⁺ ions m⁻²s⁻¹) plasma generator. Magnum-PSI is a highly accessible laboratory experiment in which the interaction of magnetized plasma with different surfaces can be studied. This experiment will provide new insights in the complex physics and chemistry that will occur in the divertor region of the future experimental fusion reactor ITER. Here, extremely high power and particle flux densities are foreseen at relatively low plasma temperatures. Magnum-PSI will be able to simulate these conditions in detail. In addition, conditions can be varied over a wide range, such as target material, plasma temperature, beam diameter, particle flux, inclination angle of target, background pressure, magnetic field, etc.

We present the current status of Magnum-PSI and the first experimental results. The vacuum, plasma and cooling systems have already been completed, which resulted in first, non-magnetised, low power, argon plasmas and verification of the vacuum performance in June 2009. Completion of the motor controlled target manipulator and the vacuum system of the analysis chamber followed in January 2010. Additionally, to support diagnostic developments, vibration measurements on the target have been performed. At the time of this conference, the superconducting magnet, the Thomson scattering system, Optical Emission Spectroscopy, pyrometry, and the hydrogen control should be installed and operational.