

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Enhancement of helium exhaust by resonant magnetic perturbations at TEXTOR-DED and LHD¹ O. SCHMITZ, UW Madison, M. KOBAYASHI, NIFS, A. BADER, UW Madison, S. BREZINSEK, FZJ, T.E. EVANS, GA, H. FUNABA, M. GOTO, K. IDA, O. MITARAI, T. MORISAKI, G. MOTOJIMA, Y. NARUSHIMA, NIFS, D. NICOLAI, U. SAMM, FZJ, H. TANAKA, M. YOSHINUMA, NIFS, Y. XU, SWIPP, TEXTOR EXPERIMENT TEAM, LHD EXPERIMENT TEAM — We demonstrate in this paper that resonant magnetic perturbation (RMP) fields can be used to enhance helium exhaust. Results from TEXTOR-DED as example for a tokamak with a pumped limiter and from the Large Helical Device LHD with the closed helical divertor as example for a heliotron device are presented. In both devices RMP fields are applied to generate a magnetic island located in the very plasma edge. The effective helium confinement time is decreased by up to 30% at LHD and up to 45% at TEXTOR-DED when RMP fields are applied. The measurements from both devices support that this reduction is caused by combination of enhanced outward transport of helium, improved coupling to the pumping systems yielding improved exhaust of helium from the SOL and reduced fueling efficiencies for both, injected and recycled helium.

¹Work supported in part by JSPS KAKENHI Grant Numbers 25420893, start up funds of the Department of Engineering Physics at the University of Wisconsin - Madison, USA and U.S. DOE Contract #: DE-SC0013911

Oliver Schmitz
University of Wisconsin - Madison, Department of Engineering Physics,
53706, Madison, WI

Date submitted: 22 Jul 2015

Electronic form version 1.4