Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Nitrogen-induced complete divertor detachment during stable H-Mode operation in ASDEX Upgrade FELIX REIMOLD, MATTHIAS BERNERT, DAVID COSTER, RAINER FISCHER, ARNE KALLENBACH, RACHAEL MCDERMOTT, STEFFEN POTZEL, ULRICH STROTH, ELEONORA VIEZZER, MARCO WISCHMEIER, Max-Planck Institute for Plasma Physics, ASDEX UPGRADE TEAM — Future fusion devices like DEMO will likely require to be operated with a detached divertor to meet power exhaust requirements and material limits alike. Detachment of the inner divertor target is regularly observed in H-mode operation in various tokamaks. Despite some efforts complete divertor detachment in H-mode at both divertor targets simultaneously had been an inaccessible operation regime in the all-tungsten ASDEX Upgrade so far. Recently, however, stable H-mode operation with completely detached divertor targets has been achieved. The complete detachment of the outer target was induced by simultaneous, strong nitrogen and deuterium puffing into the private-flux region, i.e. the divertor. An appropriate seeding scheme avoids central accumulation of tungsten and leads to almost complete mitigation of tungsten sputtering at the divertor targets. The newly found detachment regime in H-mode is compared to recent findings in L-mode and the impact of strong nitrogen seeding on the (divertor) plasma is assessed. In order to understand the experimental results and gain further insight into the H-mode detachment process accompanying numerical modeling efforts with SOLPS are carried out.

Felix Reimold
Max-Planck Institute for Plasma Physics

Date submitted: 12 Jul 2013 Electronic form version 1.4