

Features of detached plasmas predicted for W7-X

Y. Feng

Max-Planck-Institute für Plasmaphysik, D-17491 Greifswald/Germany

e-mail address: feng@ipp.mpg.de

Detachment is a SOL plasma state characterized by enhanced radiation and reduced recycling. Extrapolation of the present divertor experiment results to reactor conditions has shown that most of the thermal power must be removed from the SOL before reaching solid surfaces. Thus, the reactor-relevance of a divertor concept is largely determined by its performance under detachment conditions. Here, the most crucial issues are the maximum power removal capability of a divertor configuration and the possible limiting factors, the particle exhaust efficiency under degraded recycling conditions, impurity control under intensive radiation as well as the stability of the detached plasmas. Using the EMC3-Eirene code and based on the modelling experience from W7-AS and LHD, this paper presents a numerical analysis on these issues for the W7-X island divertor, providing a reference for developing the experimental divertor programme on W7-X.