Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Local and global gyrokinetic studies of turbulence in transport barriers DANIEL TOLD, ANDREAS BURCKHART, TOBIAS GOERLER, FRANK JENKO, ELISABETH WOLFRUM, Max-Planck-Institut fuer Plasmaphysik, EURATOM Association, Boltzmannstrasse 2, 85748 Garching, Germany, STEPHAN BRUNNER, OLIVIER SAUTER, Ecole Polytechnique Federale de Lausanne, CRPP, CH-1015 Lausanne, Switzerland, ASDEX UPGRADE TEAM — In the present work, the gyrokinetic turbulence code GENE is employed to study plasma microturbulence in both core and edge transport barriers. Physically comprehensive simulations, making use of both the local and global versions of GENE, are performed. The global version of GENE is applied to discharges of the TCV tokamak, which exhibit an electron internal transport barrier. In discharges with weaker barriers, TEM-type turbulence is found to be the dominant source of electron heat flux, confirming earlier findings. For steeper barriers, a detailed sensitivity study shows enhanced transport due to small-scale ETG turbulence which, for the simulations in closest agreement with experiment, becomes comparable to the large-scale TEM transport. Using, on the other hand, the local approximation, the GENE code is applied to study small-scale ETG turbulence under edge transport barrier conditions as found in the ASDEX Upgrade tokamak, taking into account several different parameter sets. It is found that ETG turbulence can under certain conditions carry a large fraction of the electron heat flux. For these parameters, the absence of radially elongated streamers within the pedestal makes ETG turbulence particularly robust with respect to shear flows.

Daniel Told
Max-Planck-Institut fuer Plasmaphysik, EURATOM Association,
Boltzmannstrasse 2, 85748 Garching, Germany

Date submitted: 10 Jul 2012 Electronic form version 1.4