Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Tokamak SOL fluid simulations with self-consistent boundary conditions at the magnetic presheath edge[1] JOAQUIM LOIZU, FEDERICO HALPERN, SEBASTIEN JOLLIET, ANNAMARIA MOSETTO, PAOLO RICCI, Centre de Recherches en Physique des Plasmas, EPFL — Fluid codes simulating the dynamics of magnetized plasmas with field lines terminating on the device vessel require boundary conditions that are consistent with the plasma-wall transition region. When the magnetic field strikes the wall at an oblique angle, this transition region corresponds to the magnetic presheath entrance (MPE). A complete analytical set of boundary conditions at the MPE is provided here for the density, temperature, potential, vorticity, and parallel ion and electron velocities, that is fully consistent with kinetic simulations of the plasma-wall transition. These boundary conditions are implemented in a 3D global fluid code simulating the tokamak SOL turbulence in a limiter configuration. This allows investigating for the first time the effect of the sheath on the tokamak SOL dynamics, in particular on the steady state profiles, plasma circulation, and blob propagation, and the effect of ExB on the intrinsic plasma rotation.

[1]We aknowledge financial support by the Fonds National Suisse de la Recherche Scientifique.

Joaquim Loizu
Centre de Recherches en Physique des Plasmas, EPFL

Date submitted: 06 Jul 2012 Electronic form version 1.4