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Electromagnetic full-f gyrokinetic simulation of ASDEX SOL turbulence with discontinuous Galerkin method[1] RUPAK MUKHERJEE, NOAH R MANDELL, Princeton Plasma Physics Laboratory, MANAURE FRANCISQUEZ, MIT Plasma Science and Fusion Center, AMMAR H HAKIM, GREGORY W HAMMETT, Princeton Plasma Physics Laboratory, GKEYLL TEAM[2]
— The plasma transport in the open field line region beyond the separatrix, called the scape-off layer (SOL), is dominated by highly localized intermittent density filaments also called blobs. Originating from the interaction between magnetic curvature and E X B drifts, these blobs leak a sizable fraction of heat and particles perpendicular to the magnetic field towards the first-wall and can help spread out the power on a wider region of the divertor [1]. Using the Gkeyll computational plasma framework, we perform nonlinear electromagnetic simulations in helical, open field lines as a rough model for tokamak scrape-off layer [2], of the Axially Symmetric Divertor Experiment (ASDEX) Upgrade [3,4]. The simulation captures the spontaneous generation of the plasma blobs and produces significant particle and heat flux in the cross field direction towards the wall. In addition, the dynamically relaxed ion temperature profile attains a value higher than the electron temperature profile in the turbulent steady-state, quite similar to the experimental estimates. 1) D A DIppolito, et al, PoP, 18, 060501, 2011. 2) N R Mandell, et al, JPP, 86, 905860109, 2020. 3) B Nold, et al, PPCF, 52, 065005, 2010. 4) G Birkenmeier, et al, PPCF, 56, 075019, 2014

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