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Gyrokinetic simulation of residual turbulence in transport barriers FRANK JENKO, DANIEL TOLD, TOBIAS GOERLER, STEPHAN BRUNNER, OLIVIER SAUTTER — One of the ultimate aims for gyrokinetic simulation is to describe the formation and evolution of transport barriers. An important step in that direction is the study of the residual turbulence in established barriers - a challenging task in itself, given that a wide range of spatio-temporal scales can be involved. In the present work, we employ the physically comprehensive, nonlocal gyrokinetic turbulence code GENE to study turbulence in both core and edge transport barriers. First, we apply GENE to a set of discharges in the TCV tokamak which exhibit electron ITBs. Nonlinear gyrokinetic simulations are used to examine the influence of a varying current profile on the strength of the barrier. For each case, the transport spectra reveal how much transport (for each channel) is done in the low-k, medium-k, and high-k regimes, respectively. The role of ETG turbulence is discussed. Second, we explore the role of ETG turbulence in a typical ASDEX Upgrade H-mode discharge. Numerical convergence is carefully examined, and new insights on the characteristics of ETG turbulence in the edge will be discussed, focusing particularly on the role of streamers, which had been found to be a necessary ingredient for experimentally relevant ETG transport in core plasmas. The radial dependence of the resulting electron heat diffusivity is also examined and a simple ETG model is presented which can be used in future edge modeling efforts.

Frank Jenko
IPP Garching

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