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Gyrokinetic finite-size scaling towards ITER TOBIAS GOERLER, DANIEL TOLD, FRANK JENKO, JOERG HOBIRK, IPP Garching, PAOLA MANTICA, IFP-CNR, MICHAEL BARNES, MIT, ASDEX UPGRADE TEAM
— Though gyrokinetic simulations have become more and more mature and experimentally relevant, the majority of studies has been carried out by means of flux-tube computations, employing maximum physics but restricting to a minimal simulation volume in order to keep the computation time low, and consequently neglecting finite-size (ρ^*) effects. Global simulations, on the other hand, have often been employing reduced physics models like adiabatic electrons, electrostatic fluctuations, simplified magnetic equilibria, or collisionless dynamics. In this contribution, comprehensive global computations of actual ASDEX Upgrade and JET discharges [P. Mantica et al., Phys. Rev. Lett. 102, 175002 (2009)] as well as ITER-like cases with the plasma turbulence code GENE are presented and compared to accompanying local simulations. This way it becomes possible to study finite-size effects in non-idealized systems and address the important question on the validity of the local approximation and the actual transport scaling in a more detailed manner. These investigations may be complemented by first results of simulations coupling the transport solver TRINITY [M. Barnes et al., Phys. Plasmas 17, 056109 (2010)] with the global GENE version, thus addressing long-time scale profile evolution.

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