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Gyrokinetic simulations of the ITER pedestal[1] MIKE KOTSCHENREUTHER, D. HATCH, S. MAHAJAN, P. VALANJU, L. ZHENG, X. LIU, University of Texas at Austin — The projected ITER pedestal is several times more gyroradii wide than in existing experiments. Hence, the ExB shearing rate is much lower, compared to instability rates, and turbulent suppression is weaker. We perform a scan of normalized gyroradius, using GENE, going from existing experiments to ITER. The transport scales close to gyroBohm, over most of the range of present experiments. However, for JET-ILW parameters, turbulent suppression is weakened, giving higher transport, and this is much stronger for ITER. Numerous trends for JET-ILW are reproduced, including, enhanced transport from lack of low Z impurities, and higher separatrix density (from gas puffing). Projected transport for ITER is unacceptably high. However, it is possible to produce lower transport in several ways, including a) optimizing the pedestal density profile b) operation at higher poloidal beta (the so-called hybrid mode). With sufficiently strong optimization, the pedestal transport might even be considerably lower than conventional expectations, leading to confinement significantly better than H-mode. Here we describe the unfavorable trends, their physical origin, and the possible favorable effects, including whether they can be realized in practice.

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