

21st US Transport Taskforce Workshop
March 25-28, 2008, Boulder, CO

Kinetic study of irreducible pedestal structure in an ELM free edge

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XGC0 equilibrium kinetic edge particle code and XGC1 gyrokinetic edge particle code are used to study the ion and electron pedestal structure in a realistic geqdsk tokamak edge geometry. Both codes are operated in the full-f mode for ions and electrons. With the ion and electron heat out-flux from the core plasma, and the neutral particle in-flux from the wall, pedestals are formed and grow accordingly. The steepest, irreducible pedestal structure is obtained when the turbulence is turned off. This will be the baseline pedestal structure before a turbulence modification (widening). Degree of the turbulence modifications to the irreducible baseline pedestal structures can define another distinction between the H and L modes. Improvement from the previous “Chang-Groebner” pedestal scaling will be reported, which only considered the ion neoclassical equilibrium solutions. As the RMP is turned on, the pedestal structure changes dramatically. RMP effect on pedestal structure will also be discussed, time permitting.

This work is supported by grants from US DOE.
