Advances in Predictive Capability of Pedestal Structure from FY11 Joint Research Target,* R.J. Groebner, P.B. Snyder, General Atomics; C.S. Chang, PPPL; J.W. Hughes, MIT; R. Maingi, ORNL; X.Q. Xu, LLNL - Joint experiment/theory/modeling research, performed as part of a US DOE Joint Research Target in FY2011, has led to improved predictive capability of the H-mode pedestal structure. Comparisons of experiments in C-Mod, DIII-D and NSTX with ELITE and BOUT++ show that the pedestals in the three machines reach the predicted peeling/ballooning (PB) limit at the onset of Type-I ELMs. Studies in all three devices show that the pedestal width scales approximately as the square root of the pedestal beta poloidal. This is expected if the pedestal $p'$ is limited by kinetic ballooning modes (KBMs). Coherent density fluctuations with characteristics expected for KBMs have been observed in some plasma conditions in DIII-D. The EPED model combines models for bootstrap current, PB modes and KBMs and predicts the pedestal pressure in DIII-D and C-Mod to within ~20%.

* This work was supported in part by the US Department of Energy under DE-FC02-04ER54698, DE-AC02-09CH11466, DE-FC02-99ER54512, DE-AC05-00OR22725 and DE-AC52-07NA27344.