Topic	**Requested:** ☐ Oral ☐ Poster	**Panel suggestion:** ☐ Oral ☐ Poster

Scaling of H–mode Pedestal Characteristics to ITER*

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The characteristics of the H–mode pedestal were studied in discharges with the same shape and aspect ratio as proposed for ITER, with *q* varying from 3 to 6 and a range of densities, plasma currents, and triangularity. The energy confinement enhancement factor, H, in these ITER shape discharges was found to be strongly correlated with the height of the H–mode pressure pedestal, with H scaling roughly as $\left(\beta_T^{PED}\right)^{1/2}$, where PED corresponds to the value at the top of the H–mode pedestal. The edge pressure gradient just before an ELM scaled as would be expected for the first stable ideal ballooning mode limit, in that the normalized edge electron pressure gradient, $\alpha_e = Rq^2 dp_e/dR/(B^2/2\mu_0)$, was roughly independent of *q*, heating power, and density. However the edge electron pressure gradient alone was found to somewhat greater than the first stable limit, which was computed using the BALOO ideal infinite n code, and in many cases the edge region was computed to have access to the second stable regime. The width of the edge steep gradient region, which is presumed to correspond to the H–mode transport barrier, in dimensionless form was found to scale equally well with edge pressure, $\delta/R \propto \left(\beta_P^{PED}\right)^{1/2}$, or edge temperature, $\delta/R \propto \left(\rho_P^{PED}/R\right)^{2/3}$. Assuming that ITER will reach the same α_e value obtained in DIII–D, (In DIII–D the total pressure gradient exceeds the calculated first stable limit), then the two scalings above for the width would predict edge temperature values for ITER of 3.5 and 0.6 keV respectively. In order to distinguish between the temperature and pressure scalings for δ, divertor pumping was used to increase the pedestal temperature at constant pedestal pressure. In these experiments the variation of the δ between ELMs could be described only by a relatively high power of pedestal temperature; however this stronge dependence of δ on pedestal temperature was not consistent with the fact that the value of δ averaged over ELMs remained constant while the pedestal temperature increased by a factor of two as a result of the divertor pumping. This fact would rule out a simple temperature, ρ_P, scaling for δ and supports the β_P scaling and the higher, 3.5 keV, estimate for ITER edge temperature.

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*Work supported by U.S. Department of Energy under Contract No. DE-AC03-89ER51114.