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Theory Experiment

Effect of Edge Neutral Source Profile on H-mode Pedestal Height and ELM Size,* T.H. Osborne, *GA* – Although the steep temperature gradient region in the H-mode pedestal is representative of the transport barrier width, the shape of the density profile responds to changes in the particle source. At higher density, neutral penetration is reduced and the steep density gradient region narrows and moves outward relative to the temperature profile; this in turn narrows the high pressure gradient region. Experiments in which the pressure width was narrowed by gas puffing at otherwise fixed parameters, or at fixed pedestal collisionality and q by increasing I_p , resulted in reduced pedestal beta and ELM size. Peeling-ballooning (PB) mode stability calculations, using the ELITE code, indicate the eigenmode width is reduced and the toroidal mode number increases (conditions generally associated with reduced ELM size) as the high pressure gradient region is narrowed and moved outward. For ITER at low pedestal collisionality, PB mode critical pressure gradient is expected to increase at reduced width, perhaps maintaining pedestal beta with smaller ELMs.

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