# Limits to H-mode Pedestal Pressure Gradient in DIII-D*

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The temporal evolution of the total pedestal pressure profile has been measured during the full edge localized mode (ELM) cycle of Type I ELMing H-mode discharges in DIII-D in order to test models of pressure-gradient limiting phenomena. Scaling studies with linear peeling-ballooning theory predict that the pressure gradient at an ELM crash scales approximately as the product $I_pB_T$ [1]. This scaling is a good description of the maximum pressure gradient in scans of $I_p$ and $B_T$, with measurements made just before an ELM crash. For the inter-ELM period, a new model predicts that kinetic ballooning (KB) modes are excited during build-up of the pedestal and cause saturation of the pressure gradient prior to an ELM [2]. Measurements made during the inter-ELM period show that the pressure gradient varies by a factor of ~3–10 across the pedestal. The general trend is for gradients to increase with time during the inter-ELM cycle; an increase in pedestal width is often observed as well. However, some regions of the profile, particularly in the outer half of the pedestal, can reach an approximate steady state long before an ELM crash. Even when this happens, the pressure gradient often continues to increase in other parts of the pedestal. The saturation of gradients might be a sign of gradient limiting phenomena, but further analysis is required to determine if KB modes are responsible.

[1] P.B. Snyder et al., 2004 *Plasma Phys. Control. Fusion* **46** A131.
[2] P.B. Snyder et al., 2008 *Phys. Plasmas* **16** 056118.

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