STRUCTURE, STABILITY AND ELM DYNAMICS OF THE H–MODE PEDESTAL IN DIII–D

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ABSTRACT. Experiments are described that have increased understanding of the transport and stability physics that set the H–mode edge pedestal width and height, determine the onset of Type-I edge localized modes (ELMs), and produce the nonlinear dynamics of the ELM perturbation in the pedestal and scrape-off layer (SOL). Models now exist for the n_e pedestal profile and the p_e height at the onset of Type-I ELMs, and progress has been made toward models of the T_e pedestal width and nonlinear ELM evolution. Similarity experiments between DIII–D and JET suggested that neutral penetration physics plays an important role in the relationship between the width and height of the n_e pedestal. Plasma physics appears to dominate in setting the T_e pedestal width. Measured pedestal conditions including edge current at ELM onset agree with intermediate-*n* peeling-ballooning (P-B) stability predictions. Midplane ELM dynamics data show the predicted (P-B) structure at ELM onset, large rapid variations of the SOL parameters, and fast radial propagation in later phases, similar to features in nonlinear ELM simulations.

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