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Notable Findings From Recent Core-Edge Studies of High Power AT Plasmas on DIII-D[1] T.W. PETRIE, A. LEONARD, T. LUCE, D. PACE, F. TURCO, M. VAN ZEELAND, GA, M.E. FENSTERMACHER, C. HOLCOMB, M. MAKOWSKI, LLNL, W. SOLOMON, PPPL — Recent experiments on DIII-D have focused on specific issues pertaining to high power, high performance hybrid plasmas, as characterized by β_N = 3-4, H_{98} = 1.3-1.7, $P_{IN} \leq$ 20 MW, and $q_{95} \cong$ 4.5-6.5. For these near-double null configurations, divertor peak heat flux (q_P) $\propto I_P^{0.9}$ $P_{IN}^{0.9}$ at constant B_T. Carbon accumulation in the core rose significantly as P_{IN} was increased, particularly when counter-beams were used; prompt beam particle losses by counter-beam injection to the outer midplane walls was 10-20%. Nearly doubling the poloidal flux expansion at the divertor target resulted in only a fraction of the expected reduction in q_P. However, inhibiting particle escape from the divertor by baffling the SOL side of the target reduced q_P by 30-40%. The puff-and-pump radiating divertor was less effective in reducing q_P while maintaining density control at highest P_{IN} and β_N than it was at lower P_{IN} and β_N. Other features of high power AT operation will also be presented.

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