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Overview of Alcator C-Mod Research[1] A. E. WHITE, MIT-PSFC — Alcator C-Mod, a compact (R=0.68m, a=0.21m), high magnetic field, $B_t \leq 8$T, tokamak accesses a variety of naturally ELM-suppressed high confinement regimes that feature extreme power density into the divertor, $q_{||} \leq 3$ GW/m^2, with SOL heat flux widths $\lambda_q < 0.5$mm, exceeding conditions expected in ITER and approaching those foreseen in power plants. The unique parameter range provides much of the physics basis of a high-field, compact tokamak reactor. Research spans the topics of core transport and turbulence, RF heating and current drive, pedestal physics, scrape-off layer, divertor and plasma wall interactions. In the last experimental campaign, Super H-mode was explored and featured the highest pedestal pressures ever recorded, $p_{ped} \approx 90$ kPa (90% of ITER target), consistent with EPED predictions. Optimization of naturally ELM-suppressed EDA H-modes accessed the highest volume averaged pressures ever achieved ($<p>>2$ atm), with $p_{ped} \approx 60$ kPa. The SOL heat flux width has been measured at $B_{pol} = 1.25$T, confirming the Eich scaling over a broader poloidal field range than before. Multi-channel transport studies focus on the relationship between momentum transport and heat transport with perturbative experiments and new multi-scale gyrokinetic simulation validation techniques were developed.

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