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Overview of Alcator C-Mod Research[1] EARL MARMAR, Massachusetts Institute of Technology, ALCATOR C-MOD TEAM — C-Mod is the only divertor tokamak in the world capable of operating at B fields up to 8 T, equaling and exceeding that planned for ITER. C-Mod is compact, accessing regimes of extreme edge power density ($q_{||}$~1 GW/m^2). surpassing the design for ITER, and approaching the levels envisioned in power plants. C-Mod results are particularly important for providing the physics basis of the high-field, compact tokamak approach. Results of experiments and related modeling span the topics of core transport and turbulence, RF heating and current drive, pedestal physics, scrape-off layer, divertor and plasma-wall interactions. ICRF has been successfully applied to control and reverse accumulation of high Z impurities in the core plasma. For the first time ever, feedback of low Z seeding for divertor power dissipation has been tied directly to real-time plasma power fluxes measured on the high-Z metal PFCs in the divertor, and used to mitigate those fluxes with no degradation of the pedestal pressure or core confinement. The naturally ELM-less I-mode and EDA-H-mode regimes have been extended B_T =8T. I-mode threshold scalings show a weak dependence on B, yielding a significantly broader window for I-mode operation at high field. Quiescence of the high-field side scrape-off layer makes this a potentially attractive location for placement of RF actuators to ameliorate plasma interactions with launchers; the wave physics for penetration and damping, for both ICRF and LHRF appears very favorable for high-field side launch

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