Abstract Submitted
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Overview of Recent DIII-D Experimental Results[1] MAX FENSTERMACHER, LLNL, FOR THE DIII-D TEAM — Recent DIII-D experiments contributed to the ITER physics basis and to physics understanding for future devices. A new plasma response model quantitatively predicts the narrow isolated q95 windows of ELM suppression for n=1, 2 and 3 RMPs in multiple devices. ExB shear from high toroidal rotation plays a key role in very high energy confinement in SH-mode plasmas. High power X-point diverted negative triangularity discharges are characterized by high confinement, significant βN and robustly ELM-free L-mode edge. Fast Er transients triggering the L-H transition are quantitatively consistent with radial polarization currents due to Reynolds stress, thermal ion orbit loss, and ion viscosity. First main ion CER inferred pedestal ion heat flux shows transition from neoclassical at high ν*, to strongly anomalous at low ITER ν*. Alfvén eigenmodes close to the ion cyclotron frequency are stabilized via a controlled energetic ion density ramp. Increased off-axis NB power reduces AE drive giving improved fast ion confinement in high-qmin plasmas. NIMROD simulations of shell-pellet injection show outer flux surfaces maintained as core thermal energy is radiated. SOLPS-ITER analysis shows importance of SOL ExB drifts in SAS simulations. SOL radial heat flux width expands at high power and plasma density, exceeding empirical scaling but consistent with MHD stability limits.

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