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Measurements of tearing mode effects on pedestal plasma fluctuations and divertor footprint currents[1] GUANYING YU, University of California, Davis, TODD EVANS, General Atomics, San Diego, YILUN ZHU, University of California, Davis, BRENDON LYONS, General Atomics, San Diego, DMITRI ORLOV, University of California, San Diego, WEN WU, General Atomics, San Diego, NEVILLE LUHMANN, University of California, Davis — A linear single fluid M3D-C1 model of the plasma response to a rotating ˜53 kHz 4/3 tearing mode (TM) confirms the experimentally observed connection between core TM and enhanced pedestal electron temperature modulation as well as the plasma floating potential in the divertor region. Analogous to the plasma response from an external resonant magnetic perturbation, the internal magnetic perturbation field from the island is analytically generated with a current filament model inside the plasma and applied to the M3D-C1 plasma response simulation. The non-resonant perturbation from the core island excites a peeling response at the edge, which leads to an enhanced electron temperature modulation at the TM's frequency. The temperature fluctuation response in M3D-C1 is loaded into the synthetic diagnostic and matches the Electron Cyclotron Emission Imaging (ECEI) measurement in the pedestal. The TM's magnetic perturbation at the edge is ˜1.5 Gauss measured by mid-plane Mirnov coils and thus exerts a non-negligible millimeter-level distortion on the mid-plane separatrix. Using field line tracing results from the TRIP3D code, the divertor footprint is found to be modulated at ˜53 kHz by the TM's magnetic perturbation. The divertor footprint defines the interaction area of hot electrons from the foot of the pedestal during the presence of error fields and thus significantly changes the local plasma floating potential, which appears as fluctuations on the divertor Langmuir probe currents

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