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Absence of Ion-scale Core Turbulence and Transport Barrier Formation with Passive/active Divertor Biasing in the C-2/C-2U Field Reversed Configuration MICHEL TUSZEWSKI, D. FULTON, Tri Alpha Energy, Inc., C. LAU, I. HOLOD, Z. LIN, UCI, B.H. DENG, H. GOTA, T. TAJIMA, M. BINDERBAUER, L. SCHMITZ, Tri Alpha Energy, Inc., TAE TEAM — Experimentally measured inverted core density fluctuations spectra show the absence of ion-scale modes in the FRC core, in agreement with linear, local gyrokinetic simulations. The absence of ion-scale core fluctuations is attributed to a combination of Finite Larmor radius effects, short fieldline connection length, and the radially increasing magnetic field gradient. In contrast, ion-scale modes driven unstable by the radial density and electron temperature gradients are observed in the FRC scrape-off layer (SOL) with characteristic wavenumbers $2 \leq \quad k\rho_s \quad \leq 40$, consistent with the unstable mode spectrum indicated by linear gyrokinetic calculations. Electostatic passive or active divertor biasing (via a large radius LaB_6 electron emitter) maintains sufficient $\boldsymbol{EB}$ rotational shear just outside the FRC separatrix to establish an effective radial transport barrier, with a large critical density gradient comparable to or above the linear instability threshold from gyrokinetic simulations. An advanced Doppler Backscattering diagnostic design for C-2W will be shown.

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