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Control of ExBvelocity shear flow via divertor biasing in the C-2W Field-Reversed Configuration LOTHAR SCHMITZ, University of California Los Angeles, H.K. LEINWEBER, C. LAU, T. ROCHE, D. SHEFTMAN, D. GUPTA, M. NATIONS, H. GOTA, T. TAJIMA, R. SMITH, THE TAE TEAM, TAE Technologies — In the C-2W Field Reversed Configuration (FRC), the radial $\boldsymbol{E}$x$\boldsymbol{B}$ velocity shear has been controlled via divertor biasing, applied in the scrape-off layer mirror plasma just outside the FRC excluded flux radius via annular electrodes. Doppler Backscattering measurements show that the $\boldsymbol{E}$x$\boldsymbol{B}$ flow shearing rate is comparable to the plasma-frame turbulence decorrelation rate, and reduced density fluctuations levels are observed with increased flow shear. The measured $\boldsymbol{E}$x$\boldsymbol{B}$ velocity at the separatrix agrees with the impurity (oxygen IV) toroidal velocity from active Charge Exchange Recombination Spectroscopy (CHERS). Automated analysis of Doppler Backscattering data has been implemented, using GENRAY ray tracing based on Far Infrared Interferometry (FIR) density profile reconstruction. Measurements of the toroidal wavenumber spectrum confirm core FRC stability to longer wavelength ion-scale modes $k_\theta \rho_s \leq 5$, in agreement with previous measurements on the C-2U FRC [1], and Gyrokinetic simulations of the coupled core FRC/mirror scrape-off layer plasma. The first measurements of magnetic field fluctuations perpendicular to the confining magnetic field are presented, obtained via Cross Polarization Scattering [2]. [1] L. Schmitz et al., Nature Comm. 7 13860 (2016). [2] X.L. Zou et al., Phys. Rev. Lett. 75 1090-93 (1991).

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