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Direct Spectroscopic Measurement of Fast Ionic Flow in the Main SOL of Diverted Plasmas on the DIII-D Tokamak[1] N.H. BROOKS, W.P. WEST, General Atomics, R.C. ISLER, ORNL, M. GROTH, LLNL, J.A. BOEDO, UCSD — Flow velocities in the SOL at the crown of the main plasma have been determined by direct measurement of Doppler shifts in the spectral line profiles of C II and C III. In single-null discharges with **B**x∇B drift into the divertor, flow toward the inner divertor is found, with C II and C III velocities of $\sim$8x10^5 and $\sim$1.5x10^6 cm/s, respectively. The magnetic field value deduced from Zeeman splitting of these spectral lines is used to spatially localize their emissions to flux surfaces outside the separatrix, with normalized ψ-values of 1.04 and 1.045, respectively. The spectroscopically deduced C III velocity is consistent with reciprocating probe measurements of fuel ion Mach number assuming full entrainment of the doubly ionized carbon ion on the flux surface where its emission is localized. TV images of the breakup fragments from injected methane gas provide additional confirmation of the SOL impurity flow.

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N.H. Brooks
General Atomics

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