We present new 2D C\textsuperscript{2+} velocity patterns in the main SOL in DIII-D plasmas obtained from laser-calibrated Coherence Imaging Spectroscopy (CIS). Measurements focus on identifying regions of flow stagnation in and around the main plasma SOL using both wide-field-of-view and high-speed CIS systems. 2D movies of the main SOL C\textsuperscript{2+} flow patterns show significant changes including poloidal regions of flow reversal during the L-mode discharge along with regions of flow stagnation. These new data are compared with previous CIS results, where tomographically-inverted 2D images of He\textsuperscript{+} and C\textsuperscript{2+} velocity in the lower divertor for H-mode discharges [1] showed a sign reversal when the direction of the toroidal field B\textsubscript{T} was reversed, suggesting that particle drift effects in the divertor are important [1]. 2D images of the flow in the divertor from UEDGE modelling including full drifts were in qualitative agreement with the data, including the flow velocity magnitude in the range of 10-20 km/s and reversal with B\textsubscript{T}. The C\textsuperscript{2+} emission zone in UEDGE was narrower than the data [2], suggesting that additional physics mechanisms should be included in the model that enhance radial transport.

To examine the interaction of the divertor flows with those in the main plasma SOL, we use a periscope that views the main plasma and both upper and lower divertors; the view is shared by a visible emission CIS system and an infrared camera. The main SOL CIS system [3] is similar to that used in the divertor except that the camera time resolution is \sim10 ms, compared to \sim1-3 ms in the divertor. Both systems share the calibration laser and wavemeter enabling absolute velocity measurements. Because of the limited periscope camera time resolution, we focus first on 2D flow images in lower-single-null (LSN) L-mode plasmas. Main SOL C\textsuperscript{2+} data have been obtained over a wide range of DIII-D parameters, including H-mode. While the main SOL CIS data are usually averaged over ELMs, in most cases, concurrent data from the divertor system are available to examine ELM effects in this region. These new main SOL flow data are being compared with the DIII-D suite of edge diagnostics, including EUV spectroscopy and Divertor Thomson Scattering (DTS). The detailed plasma measurements provide the inputs to the UEDGE calculations with full drifts. A new PyUEDGE version facilitates comparison of the UEDGE modelling results with experimental data, including the calculation of synthetic diagnostics from the UEDGE output.


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