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10.37 Calibration and Forward Modeling for Doppler Coherence Imaging Spectroscopy on MAST-U

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An alternative calibration method has been developed for Doppler Coherence Imaging Spectroscopy (CIS). CIS is an interferometric technique for high-speed imaging of impurity flow in the tokamak scrape-off layer, where the flow zero is calibrated using a reference phase image at the rest wavelength of the targeted emission. Recent work at DIII-D has demonstrated that accurate extrapolation of this calibration image from a nearby (+/- 3.5 nm) laboratory spectral source is possible using an optical model of the instrument that is constrained using a tunable laser. Here we present an alternative implementation of this method, relying upon two spectral lamps (Cd and Zn) for the necessary dispersion characterisation. A total of six spectral lines in the range 467 nm - 509 nm are individually isolated using interference filters, allowing for calibrated velocity measurement of CIII and HeII plasma emission at 464.9nm and 468.6nm respectively. Also presented are forward modeled measurements of carbon flow in the MAST-U divertor in the conventional and Super-X configurations, generated using SOLPS. This work was supported by the Engineering and Physical Sciences Research Council [EP/L01663X/1] and also by the US DOE under DE-AC52-07NA27344 and DE-FC02-04ER54698.

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