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First Absolutely Calibrated Localized Measurements of Ion Velocity in the MST in Locked and Rotating Plasmas M. BALTZER, D. CRAIG, Wheaton College (IL), D.J. DEN HARTOG, M.D. NORNBERG, S. MUNARETTO, University of Wisconsin - Madison — An Ion Doppler Spectrometer (IDS) is used on MST for high time-resolution passive and active measurements of impurity ion emission. Absolutely calibrated measurements of flow are difficult because the spectrometer records data within 0.3 nm of the C^{+5} line of interest, and commercial calibration lamps do not produce lines in this narrow range. A novel optical system was designed to absolutely calibrate the IDS. The device uses an UV LED to produce a broad emission curve in the desired region. A Fabry-Perot etalon filters this light, cutting transmittance peaks into the pattern of the LED emission. An optical train of fused silica lenses focuses the light into the IDS with f/4. A holographic diffuser blurs the light cone to increase homogeneity. Using this light source, the absolute Doppler shift of ion emissions can be measured in MST plasmas. In combination with charge exchange recombination spectroscopy, localized ion velocities can now be measured. Previously, a time-averaged measurement along the chord bisecting the poloidal plane was used to calibrate the IDS; the quality of these central chord calibrations can be characterized with our absolute calibration. Calibration errors may also be quantified and minimized by optimizing the curve-fitting process. Preliminary measurements of toroidal velocity in locked and rotating plasmas will be shown. This work has been supported by the US DOE.

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