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**Continuous Wave Laser Induced Fluorescence with a Fast Camera**[1] MITCHELL PAUL, EARL SCIME, West Virginia University — Typically, planar laser induced fluorescence (PLIF) systems combine a high intensity pulsed laser with a gated camera to obtain 2D images of the relative density of the interrogated species in a region of interest. In a low temperature plasma, the large linewidth of a pulsed laser prevents PLIF measurements of the velocity distribution of massive species. Without velocity-resolved PLIF images, the species temperature or bulk flow cannot be extracted from the PLIF image. Single-point LIF measurements and PLIF measurements with a camera can provide temperature and flow measurements if a continuous wave (CW) laser is used. However, interrogating 2D planes of the plasma requires thousands fewer measurements when acquired with a camera instead of single-point measurements. Here, we present PLIF measurements of the temperature and flow of argon ions in a low temperature plasma using a modulated, narrow linewidth, CW laser. The fluorescent emission is acquired with a fast, camera and the laser light is spread into a thin sheet so that an entire plane of the plasma is imaged at each interrogation wavelength. Fourier analysis is conducted on each pixel of the images to separate the fluorescent emission from the background light. Replacing the PMT with the camera as the detector dramatically reduces the time needed to measure an entire plane of the plasma. Argon ion temperatures and bulk flow maps are reported in a helicon plasma source and standard single-point measurements provide the validation of the PLIF measurement.

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