TWO-DIMENSIONAL MAPPING OF ELECTRON DENSITIES AND TEMPERATURES USING LASER-COLLISION INDUCED FLOURESCENCE

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We discuss the application of the laser-collision induced fluorescence technique to produce two-dimensional maps of both electron densities and electron temperatures in a helium plasma. A collisional-radiative model is used to describe the evolution of electronic states after laser excitation. We discuss generalizations to the time dependant results that are used to simplify data acquisition and analysis. Calibration of the predictions made by the model is achieved using an cw rf discharge that is periodically perturbed via a high voltage pulse. We then demonstrate the capability of the technique by producing images of electron density and temperature of the sheath region formed around a biased electrode.