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Dynamic evolution of transient plasma as measured with laser-collision induced fluorescence ED BARNAT, Sandia Labs — Laser-collision induced fluorescence (LCIF) is utilized to produce two-dimensional maps of electron densities and electron temperatures in helium plasmas. In this presentation, the basics of the technique are discussed and means of implementing the technique are described. Particular emphasis is placed on maximizing the temporal resolution that can be realized with the technique while maintaining reasonable (usable) LCIF signals. The LCIF technique is applied to transient plasmas excited by square wave voltages applied to an electrode immersed in the plasma. When the electrode is biased positive with respect to the grounded chamber walls, additional ionization is observed and both the electron density and electron temperature increase. On the other hand, when the electrode is biased negative with respect the grounded chamber, the formation of an ion sheath is observed to form around the electrode. With the LCIF technique, we capture the two-dimensional evolution of this sheath.

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