Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Time Resolved Detection of Native Molecular Emissions and Recombination using Femtosecond Laser Induced Breakdown Spectroscopy from Organic Compounds JORGE MARTINEZ, CHARLEMAGNE AKPOVO, Florida A&M University, NATHAN BULLOCK, SUSAN ALLEN, Arkansas State University, LEWIS JOHNSON, Florida A&M University — Laser induced breakdown plasmas are "dirty" events yielding a mixture of ionized species, electrons, and non-ionized matter of various size. Molecular emissions have been detected in excited nanosecond plasmas microseconds after the ablation event. However, with these molecular signatures it is difficult to distinguish between native emissions and atmospheric recombination with respect to the sample probed. A time resolved study during and after the continuum of the plasma event produced from specific organic materials can yield a possible insight in identifying native molecular emission and recombination. In this study, a plasma was formed by interacting a femtosecond beam with Nitrobenzoic acid, Ammonium Nitrate, Benzylacetonitrile, Nitrophenol, and Phthalimide. Molecular spectral signatures of NO, OH+, CN, C_2, and NH were monitored as a function of plasma lifetime, with a 50 nanosecond gate window, delineating a trend of growth and decay. Use of a buffer gas, Argon, has been observed suppressing the impact of atmospheric oxygen, nitrogen, and hydrogen on plasma assisted recombination.

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Date submitted: 08 Feb 2011 Electronic form version 1.4