Abstract Submitted
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Optical Diagnostics[1] RICHARD MILES[2], Texas AM Univ — Partially ionized plasmas are being applied to aerospace for flow control and combustion enhancement and to medicine for wound therapies, cancer treatment, and other procedures. These plasmas are generally localized and out of equilibrium, with the kinetic temperature much lower than the electron and vibrational temperatures. They are rapidly time varying at rates on the order of nanoseconds. Conventional probes and microwave diagnostic methods are not useful, and integrated optical methods are difficult to interpret. Important parameters are the electron density and temperature, electric field, ionization fraction, molecular vibrational and rotational temperatures, dissociated fractions, ion concentrations, chemical and radical species. All these factors change rapidly in space and time. These measurement challenges have motivated the development of spatially accurate optical diagnostics, including planar imaging methods, line imaging methods, and point measurements. The presentation will focus on methods that are most useful for the measurement of rapidly time varying, localized, partially ionized plasmas. Remaining challenges involve capturing full volumetric data at rates fast enough to follow the detailed evolution of the plasmas.

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