

Abstract Submitted
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Towards Single Shot Plasma Diagnostics¹ STEPHAN REUTER, Ecole Polytechnique de Montreal, QC, Canada, BENJAMIN M. GOLDBERG, Currently with Sandia National Laboratories, CA, USA, LUKA HANSEN, Kiel University, Germany, ARTHUR DOGARIU, Princeton University, NJ, USA, RICHARD B. MILES, Texas A&M University, TX and Princeton University, NJ, USA — Single shot measurements accurately represent real time events. Highly sensitive measurements, however, typically require averaging procedures to sufficiently increase signal to noise ratio. For random events in space or time, averaging can easily lead to unwanted smearing and distortion of results. Post processing of data presents the possibility to combine the accuracy of single shot data recording with the benefits of averaging procedures. We discuss three approaches in which we collect and post-process single shot data of stochastic events such as the electric field and the flow field of an atmospheric pressure plasma jet. Firstly, time binning sorts electric field measurements in a post-processing routine according to their random delay with respect to the applied voltage in order to increase the time resolution. Secondly, advanced averaging yields an increased signal to noise ratio from post-processing that averages electric field measurements sorted by an intensity threshold. Finally, space slicing allows “discretized 3D-measurements”, spreading multiple laser sheets by a rotating mirror. We demonstrate the space slicing approach by Rayleigh scattering across a 3D-volume to capture the plasma jet’s flow field.

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