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Simultaneous Diagnostic of Temperature Distribution and Electric Field induced in Dielectric Target by Atmospheric Pressure Plasma Jet ELMAR SLIKBOER, LPP, CNRS, Ecole Polytechnique, UPMC, Universit Paris-Saclay, 91128 Palaiseau, France, ENRIC GARCIA-CAUREL, LPICM, CNRS, Ecole Polytechnique, Universit Paris-Saclay, 91128 Palaiseau, France, ANA SOBOTA, Department of Applied Physics, EPG, Eindhoven University of Technology, The Netherlands, OLIVIER GUAITELLA, LPP, CNRS, Ecole Polytechnique, UPMC, Universit Paris-Saclay, 91128 Palaiseau, France — A polarimetric technique is used to image the complete Mueller matrix of a sample under plasma exposure. This allows for the spatial investigation of the optical properties modified by the plasma. In particular, the birefringence of a BSO crystal contains information about the induced electric field in the target and hence about charges deposited on its surface by the discharge. Additional new findings shows simultaneously a secondary signal in the birefringence which is related to the temperature distribution. This is due to temperature induced strain. Measuring the temperature profile in the target allows for the investigation of the amount of heat that is produced in the plasma jet and transferred to the target. The heat distribution on the surface is investigated for different gas mixtures of both feeding gas of the jet as for the controlled environment in which it is placed. Simultaneously, the spatial and temporal evolution of surface electric field and charge deposition profiles are obtained. This simultaneous diagnostic helps gaining better understanding of the plasma kinetics involved in the atmospheric pressure plasma jet with different gas mixtures.

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