

Abstract Submitted  
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**OODR-LIF experiments on  $N_2(A^3\Sigma_u^+)$  in volume and in surface atmospheric pressure DBDs<sup>1</sup>** SANTOLO DE BENEDECTIS, PAOLO F. AMBRICO, GIORGIO DILECCE, CNR, IMIP-Bari, Italy, MILAN SIMEK, Academy of Sciences, Prague, Cz rep, CNR COLLABORATION, AVCR COLLABORATION — A calibrated optical double resonance laser induced fluorescence, OODR-LIF, has been used to measure  $N_2(A^3\Sigma_u^+)$  metastable density at high pressure in the voltage cycle of volume and surface atmospheric DBDs. OODR-LIF excitation-detection scheme is:  $N_2(A^3\Sigma_u^+, v) + h\nu_{L1} \rightarrow N_2(B^3\Pi_g, v') + h\nu_{L2} \rightarrow N_2(C^3\Pi_g, v'') \rightarrow N_2(C^3\Pi_g, v'') + h\nu_E$ . The two exciting photons (*red*- $\nu_{L1}$  and *UV*- $\nu_{L2}$ ) are generated by two independently tunable and synchronized lasers. In volume DBD,  $N_2(A)$  is measured in the discharge gap (  $d=1.5$  mm, voltage 10 kV<sub>pp</sub> at 1.8 kHz) pulsed at  $T_{ON}=5$ ms and  $T_{OFF}=10$ ms. In surface DBD,  $N_2(A)$  is measured in the gas layer over a comb electrode deposited over a ceramic plate back covered by a metallic large background electrode. The current and the applied voltage are monitored by a digitizing oscilloscope. The measured time-resolved emissions of  $N_2$  SPS and NO- $\gamma$  bands allows exploring the correlations between emissions, LIF and discharge current and implementing a calibration of OODR-LIF. The measured density is about  $10^{13}\text{cm}^{-3}$  in volume DBD while lower in a surface DBD.

<sup>1</sup>Project FIRB-MIAO

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