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Absolute Atomic Oxygen Density Measurements by Two-Photon Laser-induced Fluorescence (TALIF) in the Effluent of an Atmospheric Pressure Plasma Jet ST. REUTER, University of Duisburg-Essen, K. NIEMI, V. SCHULZ-VON DER GATHEN, Ruhr Uni Bochum, H.F. DOEBELE, University of Duisburg-Essen — A 13.56 MHz RF-excited plasma jet[1] is diagnosed in this work. The jet operates at ambient conditions. It generates a homogeneous plasma in helium or argon[2] with admixtures (~ 1 %) of molecular gases, here oxygen. The temperature of the effluent is well below 100 $^\circ$C. The jet has been set up in a planar and a concentric version; both were compared by means of TALIF-measurements. Absolute atomic oxygen density profiles have been measured in the effluent of the plasma jet. The atomic oxygen density close to the nozzle amounts to 10^{16} cm^{-3}. Even at several centimeters from the nozzle there still is 1% of the initial oxygen density. Emission spectroscopy down to 110 nm has been carried out as a function of distance from the exit nozzle with the effluent hitting an MgF_2 window in front of the slit of a vacuum UV monochromator. These spectra exhibit strong emission lines e.g. of oxygen at 130 nm, even at a distance of several centimeters from the nozzle. This work was supported by the "Ministerium für Wissenschaft und Forschung NRW"
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