## Abstract Submitted for the GEC10 Meeting of The American Physical Society

Space resolved density measurements of argon and helium metastable atoms in radio-frequency generated He-Ar micro-plasmas<sup>1</sup> BENEDIKT NIERMANN, MARC BÖKE, Ruhr-Universität Bochum, Germany, NADER SADEGHI, Universite Grenoble & CNRS, France, JORG WINTER, Ruhr-Universität Bochum, Germany, FOR1123 COLLABORATION — Space resolved concentrations of helium He<sup>\*</sup> ( ${}^{3}S_{1}$ ) and argon Ar<sup>\*</sup> ( ${}^{3}P_{2}$ ) metastable atoms in an atmospheric pressure radio frequency micro-plasma jet were measured using tunable diode laser absorption spectroscopy. Even small absorptions down to  $10^{-4}$  could be measured using lock-in technique. The absolute density of metastable atoms densities at different rf-power, flow rate and gas mixture was deduced from measured absorption rates. Metastable concentrations range from  $10^9$  to  $10^{11}$  cm<sup>-3</sup>. Analysis of spectral profiles provided the pressure broadening coefficients of both metastable atoms by helium. The spatial distribution of metastable atoms in the plasma volume was obtained for various discharge conditions. Density profiles between the electrodes reveal the sheath structure and reflect the plasma excitation distributions in the discharge volume. It reveals the dominance of the  $\alpha$ -mode discharge.

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