

Abstract Submitted  
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**Microwave techniques for electron density measurements in low pressure RF plasmas**<sup>1</sup> VIKTOR ZHELTUKHIN, Kazan National Research Technological University, ILDAR GAFAROV, Scientific-Development Company “RENARISORB Ltd.”, ALEXANDER SHEMAKHIN, Kazan Federal University — Results of the experimental studying of RF plasma jet at low pressure in the range of 10 - 300 Pa is presented. The electron density distribution both in inductive and in capacitive coupled RF discharges was measured at 1.76 MHz and 13.56 MHz consequently. We used three independent microwave diagnostic techniques such as free space (the “two-frequency” and “on the cut-off signal”) and a resonator. It is found that the electron density in the RF plasma jets is by 1-2 orders of magnitude greater than in the decaying plasma jet, and by 1-2 orders of magnitude less than in the RF plasma torch. Thus the RF plasma jet is similar to the additional discharge between the electrodes or the coil and the vacuum chamber walls. As a consequence, the formation of the positive charge sheath near the specimen placed in plasma stream is observed. It is found that the maximum of ionization degree as well as more uniform electron density distribution across the stream is observed in the range of the gas flow rate  $G_g = 0.06 - 0.12$  g/s and the discharge power  $P_d = 0.5 - 2.5$  kW.

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