

Abstract Submitted
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Modes of low-pressure longitudinal combined discharge VALERIY LISOVSKIY, NADIYA KHARCHENKO, VLADIMIR YEGORENKOV, Kharkov National University, 4 Svobody sq., Kharkov, 61077, Ukraine, RF SYSTEM GROUP TEAM — We studied in experiment the longitudinal combined (RF/DC) discharges. We applied across the electrodes the RF voltage and additionally DC voltage U_{dc} simultaneously. Experiments were performed at the nitrogen pressure of $p=0.01-5$ Torr within the range of amplitude values of the RF voltage $U_{rf} < 2000$ V, DC voltage $U_{dc} < 600$ V and $f=13.56$ MHz. The combined RF/DC discharges might exist in three modes. At low RF voltages the additional DC voltage makes a small contribution to the ionization rate of gas molecules within the plasma volume, and we observe the first mode of the combined RF/DC discharge – “non self-sustained RF discharge perturbed by the DC voltage”. When the RF voltage and the DC voltage are sufficiently large to induce the breakdown of the “cathode” layer, the discharge experiences the transition to the second mode – “combined discharge”. Just this mode is of considerable interest for plasma technology. The third mode may be obtained applying a small RF voltage to the burning DC discharge. We will call it conditionally “non self-sustained DC discharge perturbed by the RF voltage”.

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