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Three Modes of Air Atmospheric Pressure Plasma ABDEL-ALEAM H. MOHAMED, Taibah University — Atmospheric pressure plasma jet operating in air have gained a high interest due to its various applications in industry and biomedical [1]. The presented air plasma jet system is consisted of stainless steel hollow needle electrode of 1 mm inner diameter which is covered with a quartz tube with a 1 mm diameter side hole. The hole is above the tube nozzle by 5 mm and it is covered by a copper ring which is connected to the ground. The needle is connected to sinusoidal 27 kHz high voltage power supply (25 kV) though a current limiting resistor of 50 kΩ. The tested distance between the needle tip and the side hole was 1 mm or 2.1 mm gape. The electric and plasma jet formation characteristics show three modes of operations. Through these modes the plasma length changes with air flow rate to increase in the first mode and to confine inside the quartz tube in the second mode, then it start to eject from the nozzle again and increase with flow rate to reach a maximum length of 7 mm at 4.5 SLM air flow rate in the third mode. The measured gas temperature of the plasma jet can approach room temperature (300 K). Moreover, the plasma jet emission spectra shows the presence of reactive O and OH radical in the plasma jet. These results indicate that the generated air plasma jet can be used a plasma sterilization.

[1] A-A.H. Mohamed, J.F. Kolb, Schoenbach, Eur. Phys. J. D 60, 517-522 (2010).

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