

Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Electrical and optical characterization of a cold atmospheric pressure plasma jet in the ambient air VEDA PRAKASH GAJULA, Center for Energy Studies, IIT Delhi, NARAYAN BEHERA, KIRAN PATEL, AJAI KUMAR, Institute for Plasma Research — A low-cost atmospheric pressure plasma source with helium (He) as active gas has been developed keeping in view of a wide range of biomedical applications. For these applications, optimization of plasma parameters such as electron density, electron excitation temperature, gas temperature, active species, the active area of the plume, etc. are required for which critical characterization plasma plume is essential. In order to understand above, a low-temperature atmospheric pressure plasma source with helium (He) as an active gas is developed. 4 kVp-p, 33 kHz sinusoidal voltage is used to produce plasma jet. Helium gas with flow rates of up to 11 liters per minute is used to produce plasma plume of around 4 cm length into the ambient air. Thorough characterization of the plume has been carried out by using electrical and optical diagnostics. Voltage and current probes are used for understanding the electrical discharge behavior with applied voltage and gas flow whereas emission spectra measurements, ICCD imaging are used for estimating the parameters of plasma such as electron excitation temperature, electron density. The plasma density along the length of the plasma plume has been assessed and the values are in the range of $0.05\text{-}3.2 \times 10^{12} \text{ cm}^{-3}$.

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Date submitted: 03 Jul 2019

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