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PLASMA PROPAGATION SPEED MODEL FOR INVESTIGATION OF ELECTRON TEMPERATURE AND PLASMA DENSITY OF AR PLASMA IN ATMOSPHERIC PRESSURE MICRO-DBD

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A model based on plasma propagation velocity has been recently developed to estimate the electron temperature (Te) of atmospheric pressure u-DBD plasma. In this work, we have extended this model to calculate Te for plasma generated with Ar gas. Plasma has been generated by input discharge voltage of 2.7 kV at a driving frequency of ≈ 45 kHz. A high-speed single-frame intensified charged coupled device (ICCD) has been used to observe the space and time-resolved discharge images and estimate the value of plasma propagation velocity (ug). The value of ug for Ar plasma has been obtained in the range of 6.2×10^3 m/s. The electron temperature has been calculated for this plasma. The average electron temperature has been found to be about 1.18 eV and the average plasma density has been found to be about 3.62×10^{14} cm^{-3} for Ar plasma. Our results obtained with the modified convective-wave packet model can be a new contribution to plasma medicine.

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