Abstract Submitted
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Time evolution of the plasma column structure and gas temperature in pulsed surface wave discharges produced at microwave frequencies in helium at intermediate pressure JOELLE MARGOT, FABRICE VALADE, AHMAD HAMDAN, University of Montreal, FRANCOIS VIDAL, JEAN-PIERRE MATTE, INRS — Pulsed surface wave discharges produced at microwave frequency in helium at intermediate pressure (1-50 Torr) were investigated. The time-evolution of the spatial structure of the plasma column was studied by using iCCD imaging. An ionization front is observed that propagates with a typical velocity of a few km/s soon after plasma ignition and decreases rapidly afterwards until the plasma reaches its steady state. A "plasma bullet" of a few cm long is also observed several tens of microseconds after breakdown especially at lower pressure. On the other hand, by using the rotational structure of OH molecular band emission, the gas temperature was determined as a function of time at different axial positions. Depending on the operating conditions, its value is typically in the range 400-900° C. It is also found that the gas temperature reaches its steady-state value within a few hundreds of microseconds after ignition and that it decreases as the plasma columns expands.

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