Abstract Submitted
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Plasma jets for biomedical applications: PAPS control of the rare gas jets[1] JEAN-MICHEL POUVESLE, VANESSA SARRON, ERIC ROBERT, GREMI, Orleans University/CNRS, France, JEROME FONTANE, DAEP, ISAE/Toulouse University, France, THIBAULT DARNY, DELPHINE RIES, SEBASTIEN DOZIAS, GREMI, Orleans University/CNRS, France, LAURENT JOLY, DAEP, ISAE/Toulouse University, France — The development of atmospheric pressure plasma biomedical applications led number of teams to develop various types of rare gas plasma jets. It's generally thought that the plasma plume expanding in air, where most of the reactive species are produced, just follow the rare gas canal which is produced at the outlet of the plasma reactor capillary. Depending on Reynolds number (i.e. capillary diameter, gas flow rate), the rare gas flow will undergo a laminar or turbulent regime. This directly affects the reactive species distribution at the plasma/target interface, thus potentially having an influence on the realized treatment. In this work, not only we demonstrate that PAPS (Pulsed Atmospheric pressure Plasma Stream) production parameters (frequency, capillary length) directly affect the rare gas flow structure in addition to flow parameters mentioned above, but that the PAPS themselves control the gas column development outside the capillary. At low flow rate, there exists a real build up of the gas column within the first hundred of pulses and a rapid return to initial situation as soon as the plasma is off. This allows a very precise modulation of plasma application. Conversely, it can lead to misinterpretations if not taken into account properly in the treatment protocol.

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