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Discharge modes of a DC operated atmospheric pressure air plasma jet JUERGEN KOLB, Leibniz Institute for Plasma Science and Technology, XUEKAI PEI, Huazhong University of Science and Technology, JANA KREDL, Leibniz Institute for Plasma Science and Technology, XINPEI LU, Huazhong University of Science and Technology — By flowing air or nitrogen through a microhollow cathode discharge geometry an afterglow plasma jet can be generated at atmospheric pressure in air. The plasma jet has been successfully used for the inactivation of bacteria and yeast. The responsible reaction chemistry is based on the production of high concentrations of nitric oxide. Production yields depend in particular on gas flow rate and energy dissipated in the plasma. The same parameters also determine different modes of operation for the jet. A true DC operation is achieved for low to moderate gas flow rate of about 1 slm and discharge currents on the order of 10 mA. When increasing the gas flow rate to 10 slm the operation is changing to a self-pulsing mode with characteristics similar to the ones observed for a transient spark. By increasing the current a DC operation can be achieved again also at higher gas flow rates. The parameter regimes for different modes of operation can be described by the reduced electric field E/N .

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