
Numerical study on generation of very large currents in atmospheric pulsed VHF discharges

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In this talk, we present a numerical study on the generation of atmospheric plasmas in pulse-modulation radio-frequency (RF) discharges, and the corresponding similarity with the very short pulsed discharges are also discussed. The numerical data indicate that only when the RF frequency is large enough (larger than 100 MHz) the very strong current density can be observed in the first cycle during the power-on phase, and the reversal electric fields can be built only in the first cycle to reheat the electrons; As the duty cycle is increased, the value of very large current peak in the first cycle increases initially, then gets to the peak value at a duty cycle of 70%, afterwards drops to the normal value produced in the continuous discharges. Thus, by adjusting the duty cycle and modulation frequency the pulse-modulation frequency discharges with VHF frequency can be effectively optimized.

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