Plasma Bullet: Multiple Bullets, Dragon-Like shape and Segment Plume

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Due to several urgent applications, room temperature atmospheric pressure plasma jets (RT-APPJs) have attracted lots of interest worldwide in the past decade and many different types of RT-APPJs have been reported. One of the most interesting phenomena of RT-APPJs, i.e. “plasma bullet” behavior has been studied by many different groups. We know much more about the “plasma bullet” now than in the beginning. However, after a detail review of all the papers published to this day, lots of questions are still unknown. In this paper, an overview of the research on the “plasma bullet” behavior will be presented, which including the effect of the photoionization, seed electrons, Penning ionization, gas flow rate, polarity of the applied voltage, pulse rising time, pulse repetition frequency, and pulse width. In addition, some newly discovered “plasma bullet” phenomena, including the multiple bullets for a single voltage pulse, dragon shape propagation path, and virtual electrode propagation of the plasma plume (segment plasma plume) are reported1-4.