Abstract Submitted
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Combination of open pulse discharge with a capillary discharge for controlling breakdown scenario[1] IRINA SCHWEIGERT, George Washington Univ, ANDREY ALEXANDROV, Khristianovich Institute of Theoretical and Applied Mechanics, PETR BOKHAN, DMITRY ZAKREVSKY, A V Rzhanov Institute of Semiconductor Physics — Picosecond breakdown in high-voltage open pulse discharge was registered in experiments and in PIC MCC simulations at gas pressure of 10-20 Torr and 10-20 kV in our previous studies. The open discharge is the type of discharge in small gap (0.2–10 mm) with strong electric field and transparent anode, where the processes outside the gap can affect the discharge development. A disadvantage of plasma devices based on the open pulse discharge is a non-controlled moment of starting of breakdown with increasing a voltage front. To solve this problem, in this work the combined discharge is developed. It is shown in the experiment that a delay of breakdown can be provided with a combination of open high voltage discharge and capillary discharge. For simulation of the breakdown in this combined discharge consisting from open and capillary discharges we have developed a hybrid model, including 2D fluid model for slow electrons and ions, kinetic collisional model for fast electrons and Poisson equation for the electrical potential distribution. The hybrid 2D fluid and PIC MCC simulations show the features of evolution of discharge current in the combined open + capillary discharge.

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