Abstract Submitted
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Subnanosecond breakdown and higher pulse repletion rate in plasma device combining an open and capillary discharges. Experiment and simulation.[1] IRINA SCHWEIGERT, George Washington University, PETR BOKHAN, DMITRY ZAKREVSKY, A V Rzhanov Institute of Semiconductor Physics, Novosibirsk, Russia — Results of experimental and theoretical studies of the switching characteristics of plasma devices consisting of open discharge and capillary one are presented. The open pulse discharge is used as a plasma source, and the capillary discharge provides a quick decay of plasma and recovery of electrical resistivity in the inter-pulse period. A capillary tube placed outside is connected to the chamber of the open discharge. This tube with the anode inside made from Al2O3 has 5 cm length and 0.1-0.5 cm diameter. In the experiment and calculation, two cases of the external capillary discharge were considered with a) floating tube wall potential and b) the wall covering with potential equal to the anode one. The simulations of the plasma device were performed with the combined kinetic (with PIC MCC method) and fluid approaches. The results of study show that the latter case exhibits better characteristics, the breakdown time t<0.4 ns, f =100kHz, U =30kV, helium pressure p_{He} =3.5Torr.

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