Superfast fronts of impact ionization in initially biased $p^+ – n – n^+$ structures

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Ionization fronts of streamer type also occur in high–voltage semiconductor switches. Such switches are investigated and produced by the group of I. Grekhov at Ioffe–Institute St. Petersburg. Besides the streamer–Laplacian instability, additional instabilities are generated by the constrained geometry and the external resistive load in the electric circuit. In a combination of analytical and numerical approach, we have gained new theoretical insight into the operation mode of these switches.