

TO THE QUESTION ABOUT THE MECHANISM
OF LOW-FREQUENCY MODULATION
OF A HIGH-CURRENT RELATIVISTIC
ELECTRON BEAM

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S u m m a r y

The results of researches of the propagation of a relativistic electron beam (REB) with a current above the limiting one in a cylindrical drift chamber in the presence of an ion stream are given. The theoretical analysis of the dynamics of electron-ion formation is based on the particle-in-cell (PIC) method. It is shown that the joint injection of a supercritical REB and a low-energy low-current ion beam into the drift chamber can lead to the formation of both the electron virtual cathode and the ion virtual anode. The virtual anode periodically pulses with a low frequency determined by ion motion. The numerical results obtained for hydrogen and nitrogen ions show that the ratio of the frequencies of pulsations is in inverse proportion to the ratio of ion masses. Pulsations of the virtual anode result in a temporal modulation of the electron and ion currents observed at the drift chamber output.