

DYNAMICS OF CHARGED  
BUNCHES IN THE WAKEFIELD EXCITED  
BY THEM IN PLASMA

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S u m m a r y

The results of computer simulation concerning the dynamics of charged bunches in the wakefield created by them in homogeneous and inhomogeneous plasmas are reported. The proton and electron bunches in an electron-proton plasma are simulated, by using the particle-in-cell method. The simulation results are compared with those of analytical calculations. It is shown that the inverse influence of excited wakefields on ion bunches can be neglected at a distance of several tens of wakefield wavelengths, and such fields are excited only by the bunch edges. For the electron bunches, the charge density profile becomes considerably distorted at distances of about the wake wavelength. In this case, some additional mechanisms of wakefield excitation emerge owing to the decay of the initial bunch into microbunches: associated with the Cherenkov resonance (for long bunches) and with the microbunch focusing.