

Development of a Linear Ion Accelerator with RF Field Excitation Using Doppler Effect*,

V. BUTENKO, B. IVANOV, I. ONISHCHENKO, V. PRISHCHEPOV, A. YEGOROV - A linear ion accelerator has been proposed and now is being developed in which accelerating and focusing electric fields are excited by an intense electron beam due to cyclotron instability at anomalous or normal Doppler effect. The results of theoretical studies and computer simulations show the advantage of this acceleration method that will allow to obtain acceleration rate $10\text{--}100$ MeV/m, ion beam energy and current $10\text{--}100$ MeV, $1\text{--}10$ A. The design and technical documentation of an experimental accelerating stand (EAS) are worked out. The installation will have following parameters: the electron beam energy 350 keV, the current 150 A, the pulse duration 2.5 mksec, the wave frequency 148.5 MHz, the wave amplitude 56 kV/cm; the proton beam is assumed to be accelerated from 5 to 8 MeV. At present, the accelerator-injector "URAL-5" of energy 5 MeV is in operation, preliminary experiments on RF-fields excitation have been carried out, experimental investigations of an accelerating RF-resonator model (in 1:1 scaling) are performed, and the EAS is under construction.

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