

New Scheme of Two Beam Accelerator Driver on Base of Linear Induction Accelerator, A. ELZHOV, A. KAMINSKY, V. KAZACHA, E. PERELSTEIN, S. SEDYKH, A. SERGEEV, JINR, Dubna - A new scheme of two beam accelerator (TBA) driver based on a linear induction accelerator is suggested. The scheme is quite uniform and has the following characteristic properties: a) the electron beam bunching occurs at a rather low ~ 1 MeV initial energy; b) the bunched beam further acceleration occurs in the accompanying enhanced microwave that provides the steady longitudinal beam bunching along the whole driver; c) there is no total microwave power extraction anywhere in the driver; d) a waveguide is used along the driver. The driver consists of an injector, buncher and long (a few hundreds of meters) row of separate LIA sections producing the external accelerating electric field and partitioned by transition chambers. The injector produces the initial electron beam with energy 1 through 2 MeV and current 0.5 through 1 kA. This beam is injected into the buncher. It may be a travelling wave tube (TWT) working in the amplification mode. A high degree of bunching can be rather easily achieved in the TWT at the distance of ~ 1 m. Then the electron bunches continue moving in the LIA in accompaniment of the enhanced in the TWT microwave and simultaneously are accelerated in the LIA electric field. The microwave power extraction from the driver occurs only in the transition chambers. The system attains the steady state at first few tens of meters where the bunch energy increases up to the level of ~ 10 MeV. Then the section of quasi-stationary microwave generation begins where the power, that the accelerating field inserts into the beam, transforms into the microwave power. The scheme has the following merits: 1. The possibility to provide the microwave phase and amplitude stability. The phase stability can be obtained at the expense of quasi-continuity of the system; 2. Due to the bunched beam acceleration it is not necessary to have a high (~ 10 MeV) energy of the initial electron beam bunching.