

Design of a Prebuncher for Increased Longitudinal Capture Efficiency of MAMI, V.I. SHVEDUNOV, INP MSU, Russia; H. EUTENEUER, M.O. IHM, K.-H. KAISER, KPH, Mainz, Germany - An increase of longitudinal capture efficiency for the 100 keV DC beam while preserving the high beam quality of the Mainz Microtron (MAMI) would extend the cathode lifetime for the polarized gun and make it possible to get a higher peak current in the pulsed mode with the standard gun. Three types of prebunchers: multi-harmonics single cavity, multicavity fundamental frequency and a combined design were analysed both analytically and by computer simulation. The different designs were compared by the phase angle which can be accepted without essential nonlinear distortions, by their sensitivity to small parameter variations and their complexity in operation. A design including a fundamental and a second harmonic cavity, placed at a distance determined by the beam energy and the RF wavelength was chosen, which will make it possible to accept 160 deg. phase angle with small nonlinear distortions, as compared with 40 deg. in the existing design. The 3.5 MeV injector linac acceptance has been measured and prebuncher parameters were adjusted to fit to it in the best way.