

Investigation of the Rise of Compensation of High Perveance Ion Beams using a Time Resolving Ion Energy Spectrometer*, R. DÖLLING, A. JAKOB, H. KLEIN, J. POZIMSKI, Inst. f. Angewandte Physik, Univ. Frankfurt - The knowledge of the build up time of space charge compensation and the investigation of the compensation process is of main interest for low energy beam transport of pulsed high perveance ion beams under space charge compensated conditions. To investigate experimentally the rise of compensation an LEBT system consisting of a pulsed ion source, two solenoids and a drift tube as diagnostic section has been set up. The beam potential has been measured time resolved by a residual gas ion energy analyser. A numerical simulation for the calculation of selfconsistent equilibrium states of the beam plasma has been developed to determine plasma parameters which are difficult measure directly. The results of the simulation has been compared with the measured data to investigate the behavior of the compensation electrons as a function of time. The acquired data shows that the theoretical rise time of space charge compensation is by a factor of two shorter than the build up time determined experimentally. In view of description the process of space charge compensation an interpretation of the gained results is given.

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