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Space charge phenomena in a low-energy electron beam R. POZZOLI, G. BETTEGA, Universita' di Milano and INFN, Milano, Italy, M. CAVENAGO, INFN LNL Legnaro, Italy, A. ILLIBERI, M. ROME', Universita' di Milano and INFN, Milano, Italy, YU. TSIDULKO, Budker Institute of Nuclear Physics, Novosibirsk, Russian Federation — The formation and evolution of 3D coherent structures in a low-energy electron beam, where the space charge effects are dominant, have been studied experimentally in a Malmberg-Penning trap, using CCD diagnostics. The main control parameters are the spatial distributions, at the source, of the electron density, energy and current, and the magnetic field. The reflection process has been investigated by varying the electron energy and emission current. Sharp or gradual transition to the space charge dominated regime have been found. The longitudinal structure of the beam has been studied by varying the magnetic field or/and the emission current. The behavior of the observed structures is in good agreement with the simulations obtained with a PIC code which solves the Vlasov-Poisson system in the zeroth order drift approximation.

Roberto Pozzoli
Universita' di Milano

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