

Hysteresis Effects in Drift Spaces and E-Guns,
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LPI RAS - Computer simulations of beam formation in an electron gun with large compression of a thin annular beam show some hysteresis effects: a beam with different current can exist in the same external conditions. At the upper (metastable) part of a hysteresis curve the beam current exceeds Child-Langmuir current. Usually it is suggested that the variable quantity can be only voltage, while the value of beam current is determined by this voltage, which is the case for thermionic cathode. The appearance of these metastable states is possible if one has the possibility for fast and independent control of emitted current at fixed voltage, which is the case for photo-emission cathode. The results of computer simulation are presented for several simple drift and diode geometries and for the gun with large compression of annular beam. Physics reasons of such behaviour are discussed.