

space charge dominated beam pdf

The University of Maryland Electron Ring (UMER), a space-charge dominated beam transport system, is currently under construction, and will be used to improve the understanding of space-charge dominated beams. Although the UMER beam is composed of electrons, it has been designed so that it will behave in a similar manner as

LONGITUDINAL EFFECTS AND FOCUSING IN SPACE-CHARGE

3 SPACE CHARGE EFFECTS As it was shown in [3], initial mismatch disappears almost completely for initial Gaussian beams with saturation of the emittance growth. By contrast we found in Sect. 2 that random errors excite a statistical beam mismatch growth according to $M = 1 + (\pm \text{mif}/X) \text{ sN/L}$. When a space charge dominated beam is transported through a

Effect of Lattice Random Errors on a Space Charge

PDF | Heavy ion driven inertial fusion drivers and experiments use space-charge dominated beams that require longitudinal bunch compression to increase the power delivered on target. In these ...

(PDF) Drift compression of space charge dominated beams

on a single free parameter related to the ratio of space charge forces to external focusing forces. In many respects, the simulations presented here are very similar to those of a recent experiment, albeit in an isotropic system, by Bernal, et. al. [10]. The space-charge -dominated electron beam in that experiment

Energy Transfer Mechanisms and Equipartitioning in non

beam interactions on the lifetime of the space charge dominated beams was consistently observed, as illustrated in Figs. 4-6. Figure 4 shows the intensity of individual bunches in the Yellow RHIC ring at a beam energy of $E = 3.85 \text{ GeV}$. Although the initial intensity drops

BEAM-BEAM EFFECTS IN SPACE CHARGE DOMINATED ION BEAMS

assumed). We initiate a space-charge-dominated beam with a semi-Gaussian distribution and semi-axes of 2.07 and 1.17 Åcm, using 20,000 particles. The undepressed ϕ -phase advance per lattice period of the quasi-harmonic motion in the applied field is 73.8° , depressed to 15° by the space charge defocusing.

Toward Higher Order Particle Simulation of Space-Charge

A semianalytic formalism was recently developed for investigating the transverse dynamics of a mismatched, space-charge-dominated beam propagating through a focusing channel.

Halo formation in mismatched, space-charge-dominated beams

THE PROBLEM OF DISPERSION MATCHING IN SPACE CHARGE DOMINATED BEAMS M. Venturini, R.A. Kishek, and M. Reiser University of Maryland, College Park, Maryland 20742 Abstract We recently proposed a new analytical model that incorpor-

The Problem of Dispersion Matching in Space Charge

In this work, the stability issues of a space-charge dominated beam in a uniformly focusing channel are considered as an example. In Sect. II, the Hamiltonian formulation of the envelope equation is reviewed. In Sect. III, we present a brief account

Particle-Beam Approach to Collective Instabilities

Space charge limited emission in photocathode guns 1. General features of space charge dominated beams
Once free of the cathode, the electrons experience both external and internal mutual forces. The external forces are those imposed by RF, magnetic and electric fields. These are

Lecture 3 Space charge limited emission in photocathode

quadrupole, and for a space-charge dominated uniform beam. While the quadrupole is focusing in one and defocusing in the other plane, direct space charge leads to defocusing in both planes. Fig. 5:

Focusing/defocusing force F_x vs. x of a quadrupole (left), and of space-charge dominated beams: uniform (centre) and

SPACE CHARGE - CERN

sociated with the beam self-field, which is the case in most operating accelerators. With technology advancing to the extent of generating higher phase space density, interest has grown in "space charge dominated" beams, where the intrinsic

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ON EMITTANCE GROWTH IN SPACE-CHARGE DOMINATED BEAMS Yu. Zuev, NIEFA, St.Petersburg, Russia Abstract An analytic model for emittance growth in the round beam transported in arbitrary electrostatic channel is presented to reproduce the main features of the beam dynamics in real, nonlinear fields. The model bases on the

On Emittance Growth in Space-Charge Dominated Beams

The dynamics of space charge dominated beam during bunching has been studied theoretically and experimentally by many researchers , , , , , , , , , , . The average behavior of transverse beam dynamics in most of the cases is studied employing transverse envelope equations , . The transverse component of space-charge force increases after ...

Transverse dynamics of space charge dominated beam during

a space charge dominated beam is a uniform distribution contained in an ellipsoid. For such a bunch distribution, the space charge forces are linear and the emittance growth induced by those forces is totally reversible and consequently can be compensated. With the appropriate

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