Dynamic Aperture in Solenoid Lattices with Application to Muon Ionisation Cooling

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Abstract

Solenoidal focussing; dynamic aperture; interest for muon beams and ionisation cooling.

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I. SOLENOIDAL FOCUSSING LATTICES

Introduce coordinate system, solenoidal focussing

II. BEAM INVARIANTS

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Description of beam invariants and eigenemittances in solenoidal lattices

III. LATTICE DESCRIPTION

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Ionisation cooling lattices as an example; describe particular features e.g. large momentum acceptance and requirement for tight focussing.

IV. PARTICLE LIFETIME AS A METHOD FOR DYNAMIC APERTURE CALCULATION

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Describe the technique; how many cells do you need to make a good calculation? Is the "stable" region really stable?

V. SIMPLEX CONTENT AS A METHOD FOR DYNAMIC APERTURE CALCULATION

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Describe the technique; does it agree with the particle lifetime method?

VI. PARAMETERS AFFECTING DYNAMIC APERTURE

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What are the dominant terms in DA? Is it the fringe field length? Is it the field quality near to the coil?

VII. CONCLUSIONS

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