

Dynamic aperture comparison for ILC damping ring

Of DSB3_2 and DMC3

Yipeng SUN, Mauro Pivi

SLAC

Susanna Guiducci

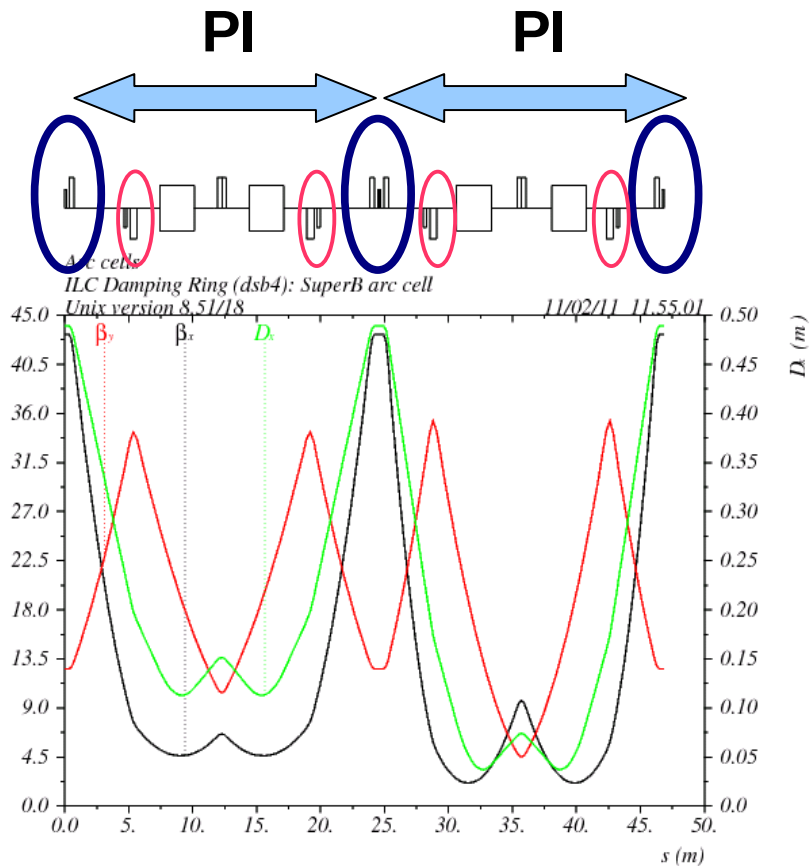
INFN

March, 2011

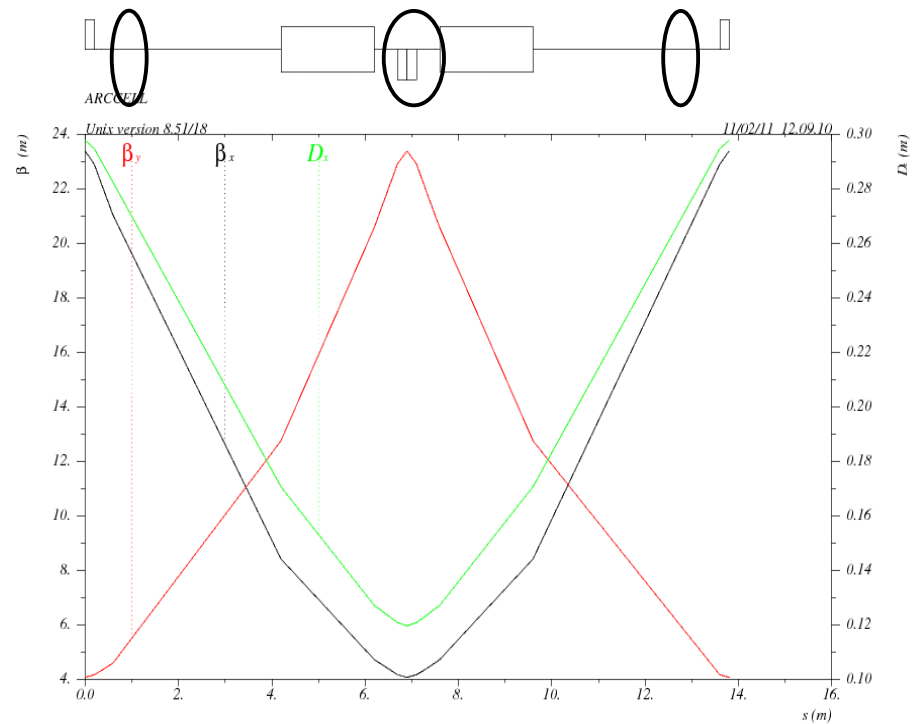
Introduction

- Both from ILC DR website
 - DMC
 - FODO arc with 3 phase advance, momentum compaction tunable
 - Pick 90 degree case, $\alpha=2.7e-4$
 - Need 15 MV to get 6mm bunch length
 - DSB
 - SuperB cell (TME shape)
 - One momentum compaction for current design
 - $\alpha=1.3e-4$
 - Need ~8 MV to get 6mm bunch length
 - Convert both from MAD to Elegant, then track DA...
 - Damping time 2400 turns, track 400 turns (DA), 256 turns (FMA)
- 3.2 km Ring Lattice Work in Progress (DSB3_2, 10 February 2011)
 - [Presentation describing the DSB3_2 lattice](#)
 - [MAD8 deck for DSB3_2 lattice](#)
 - [MAD8 command file for DSB3_2 lattice](#)
 - [DSB3_2 magnet strengths](#)
 - [DSB3_2 MAD printout](#)
 - SB2009 Proposal - Preliminary Lattice (FODO: DMC3, 19 January 2011)
 - [Presentation describing the DMC3 lattice](#)
 - [MAD8 deck for DMC3 lattice](#)
 - [MAD8 command file for DMC3 lattice](#)
 - [DMC3 magnet strengths for 90 deg optics](#)
 - [DMC3 magnet strengths for 75 deg optics](#)
 - [DMC3 magnet strengths for 60 deg optics](#)

Arc cell



DSB



DMC

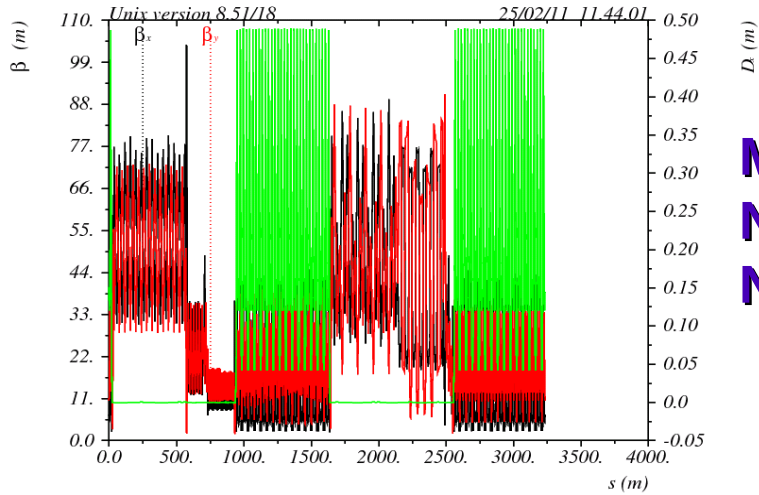
Magnets model in Elegant

- Dipole: CSBEND. NONLINEAR=0.
EXPANSION_ORDER=0.
- Quad & Sextupole: hard-edge, no fringe field. No higher order fields
- RF cavity: first-order matrix. No body-focusing
- Wiggler: dipole model, no nonlinear fields

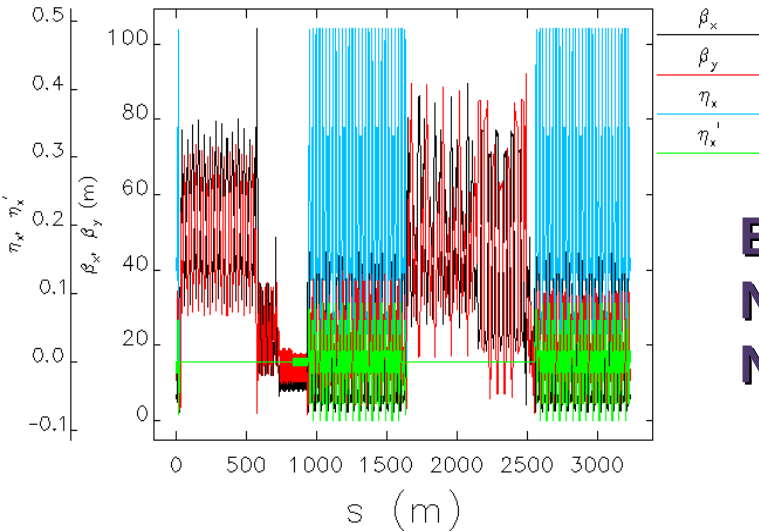
DSB (400 turns)



RINGRI

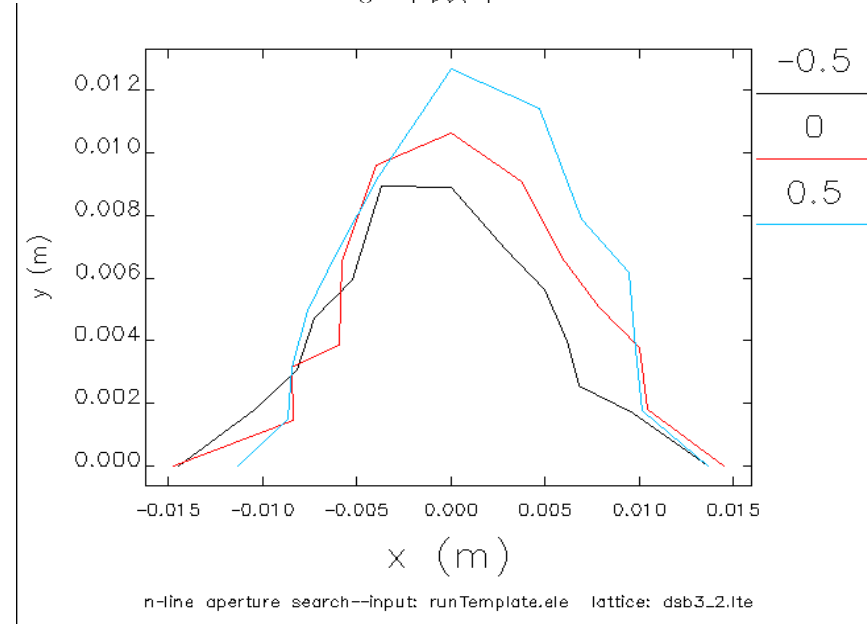
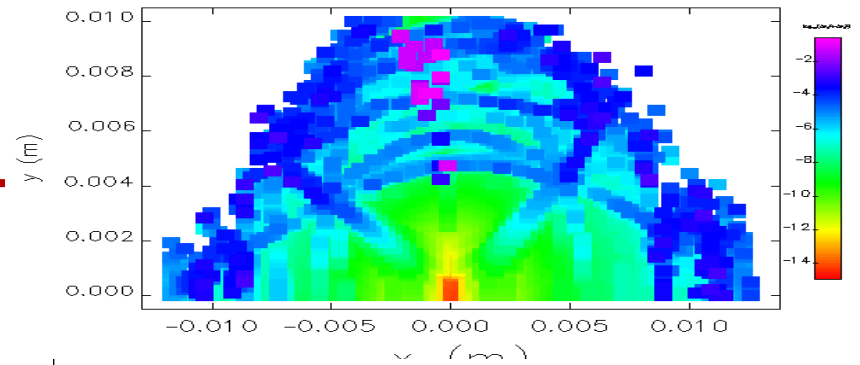


MAD
Nux=47.16
Nuy=26.26

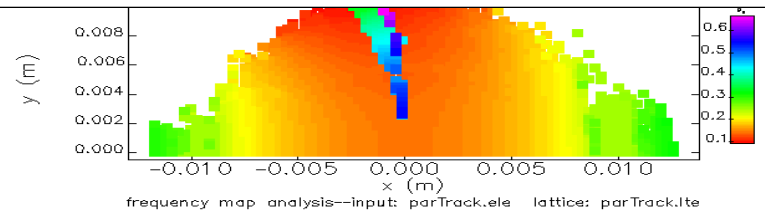


Elegant
Nux=47.15
Nuy=26.28

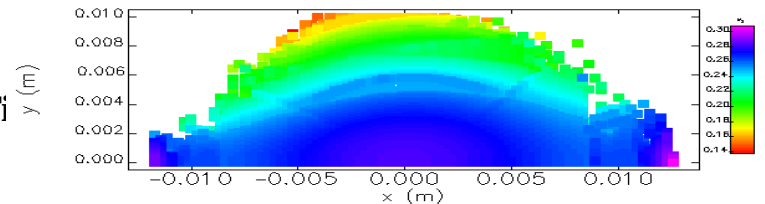
Twiss parameters--input: parTrack.ele lattice: parTrack.lte



n-line aperture search--input: runTemplate.ele lattice: dsb3_2.lte

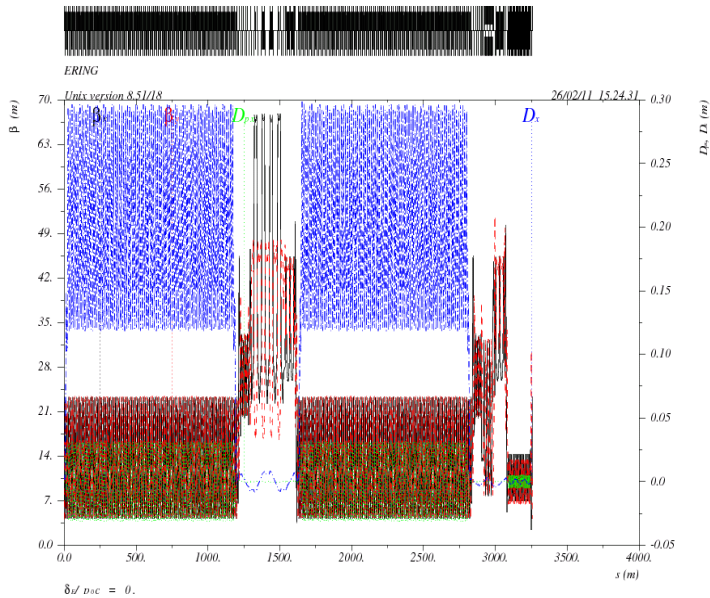


frequency map analysis--input: parTrack.ele lattice: parTrack.lte

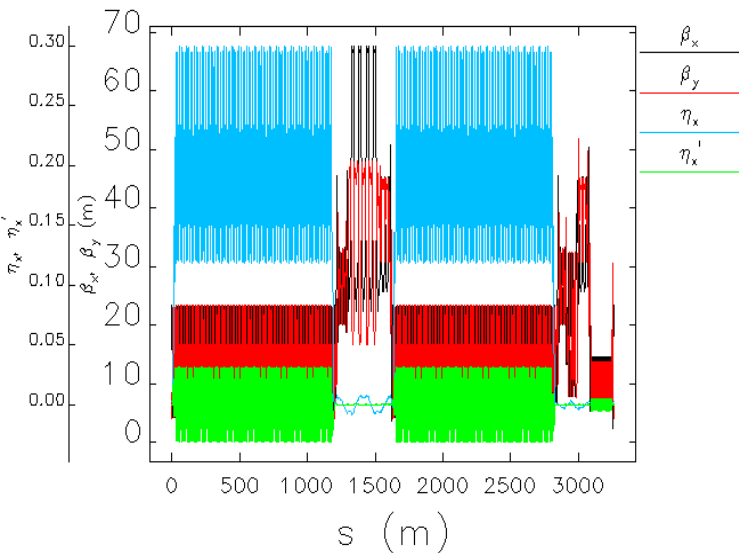


frequency map analysis--input: parTrack.ele lattice: parTrack.lte

DMC----90degree

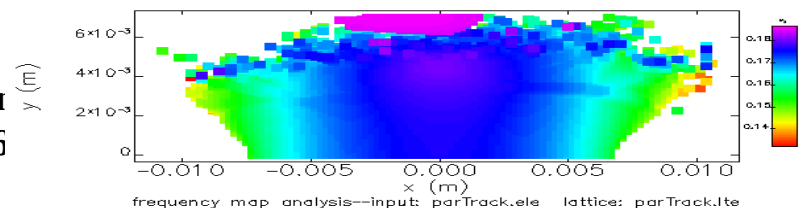
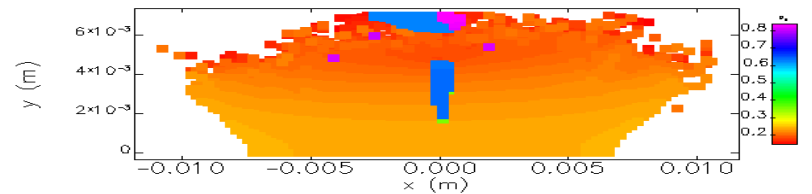
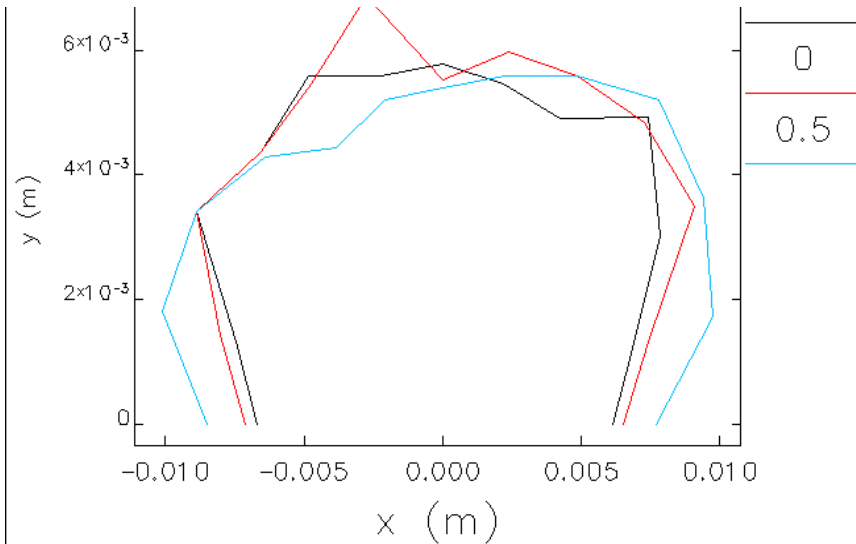
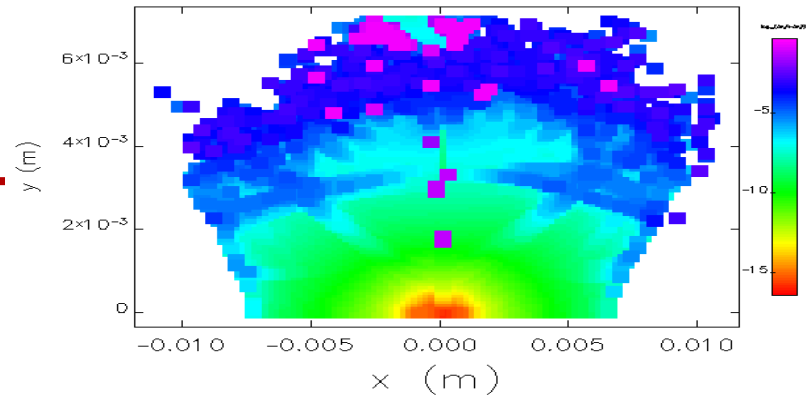


MAD
Nux=51.24
Nuy=50.17

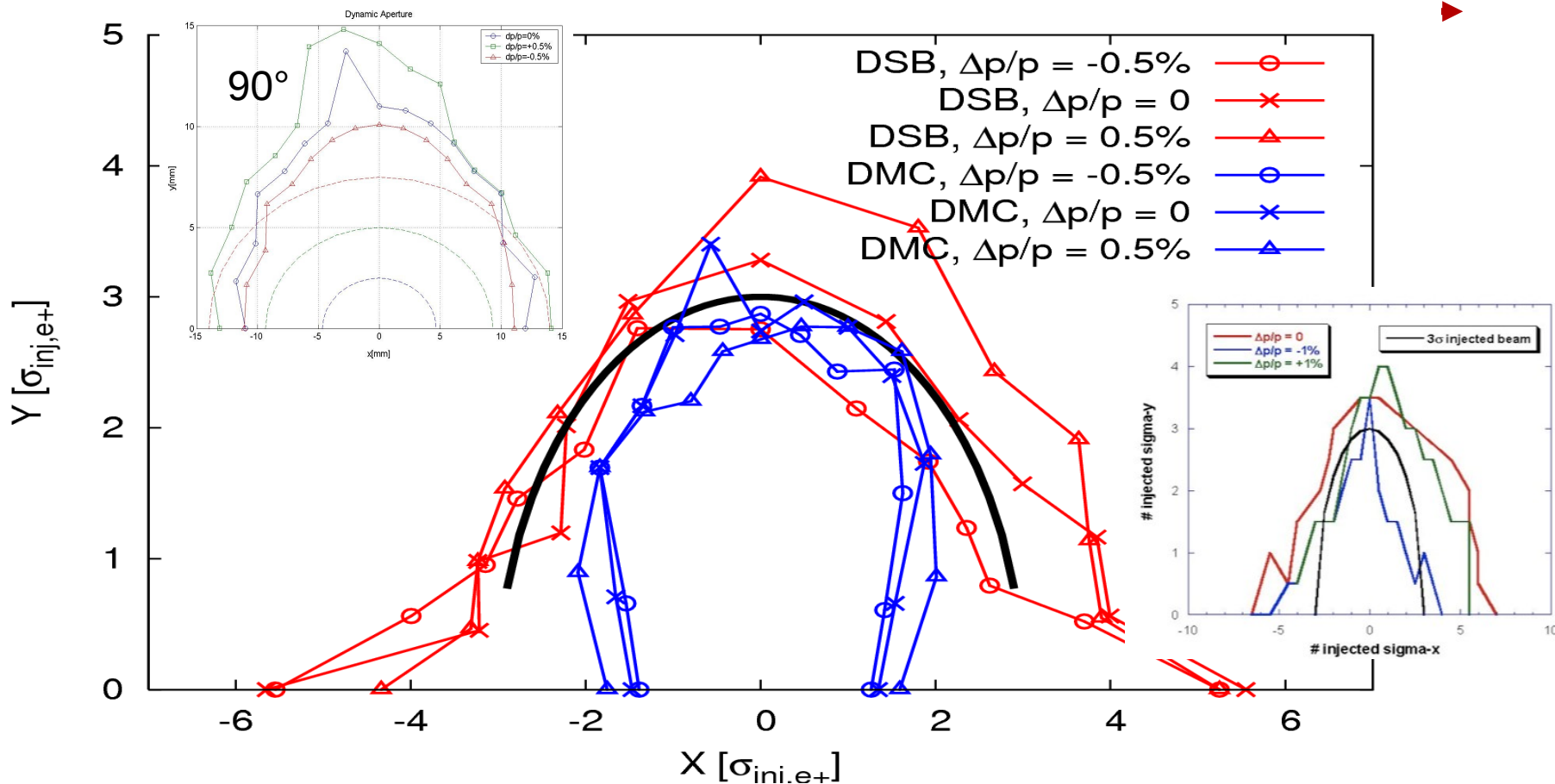


Elegant
Nux=51.24
Nuy=50.18

Presentation
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Comparison of DA



Normalized using beta at starting point, and injected positron emittance, 1sigma at 1e-6m.rad