



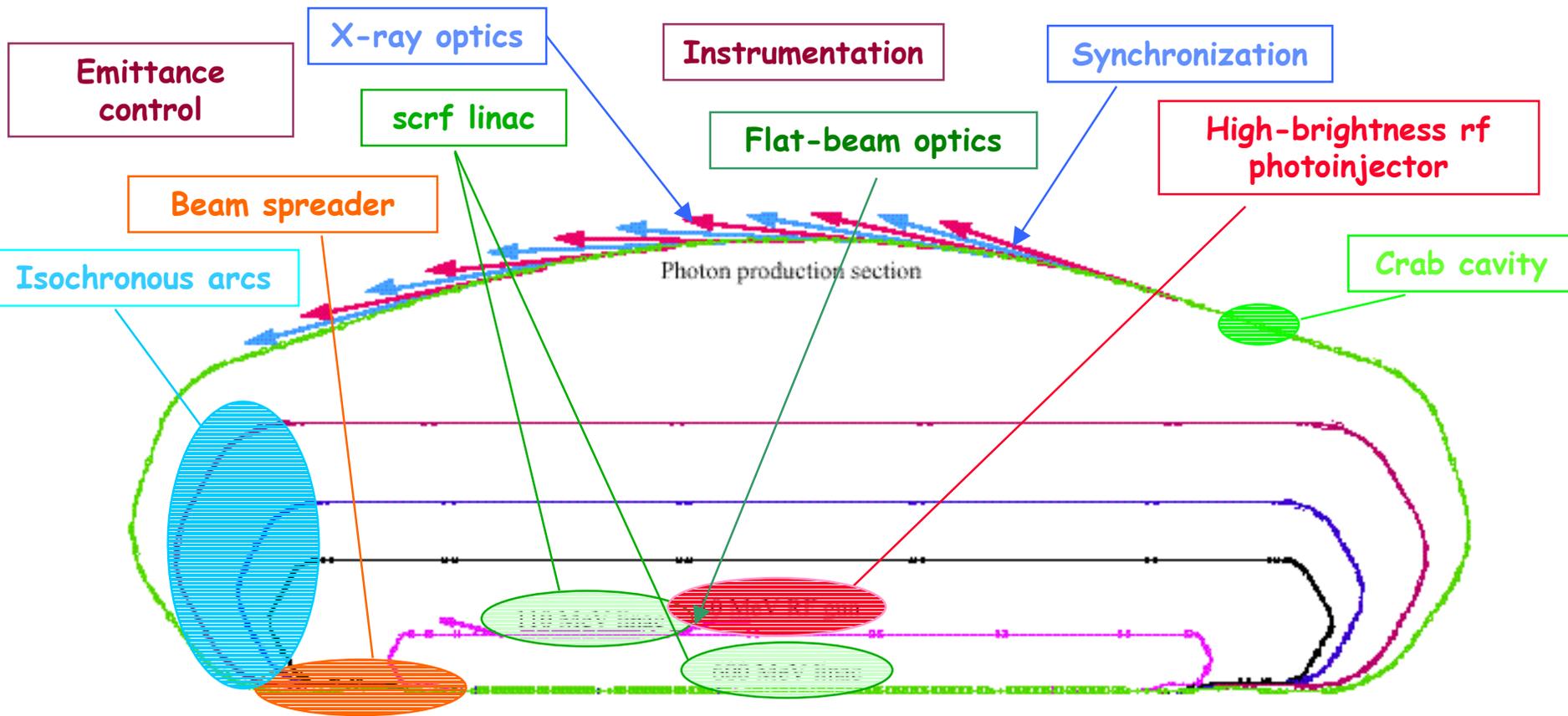
Lattice Studies: Status and Plan

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Properties of the Lattice

- Isochronous beam transport (first 3 passes)
- Bunch compression (last pass)
- Preservation of transverse (esp. vertical) emittances
- Ability to adjust Betatron tunes



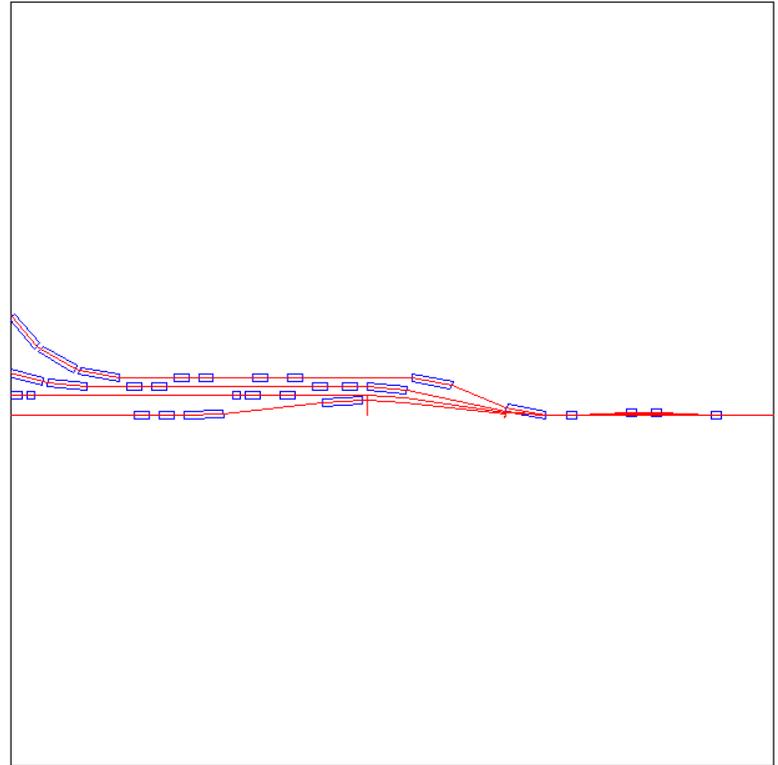
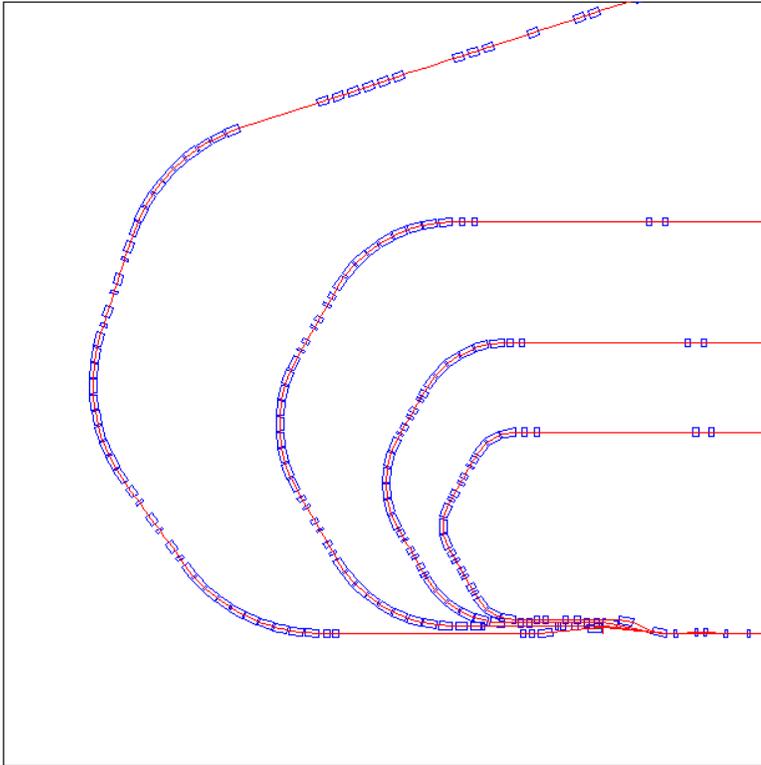


Components of the Lattice

- 32 9-cell cavities
- 2 crab cavities (soon to be included in the model)
- 6 undulators (currently not included in the model)
- 204 dipole magnets
- 191 quadrupole magnets
- 66 sextupole magnets
- Dipole correctors (1 pair per quad or cryomodule)
- Trim coils (normal and skew) on quads
- BPMs (1 per quad or cryomodule)
- Other diagnostics

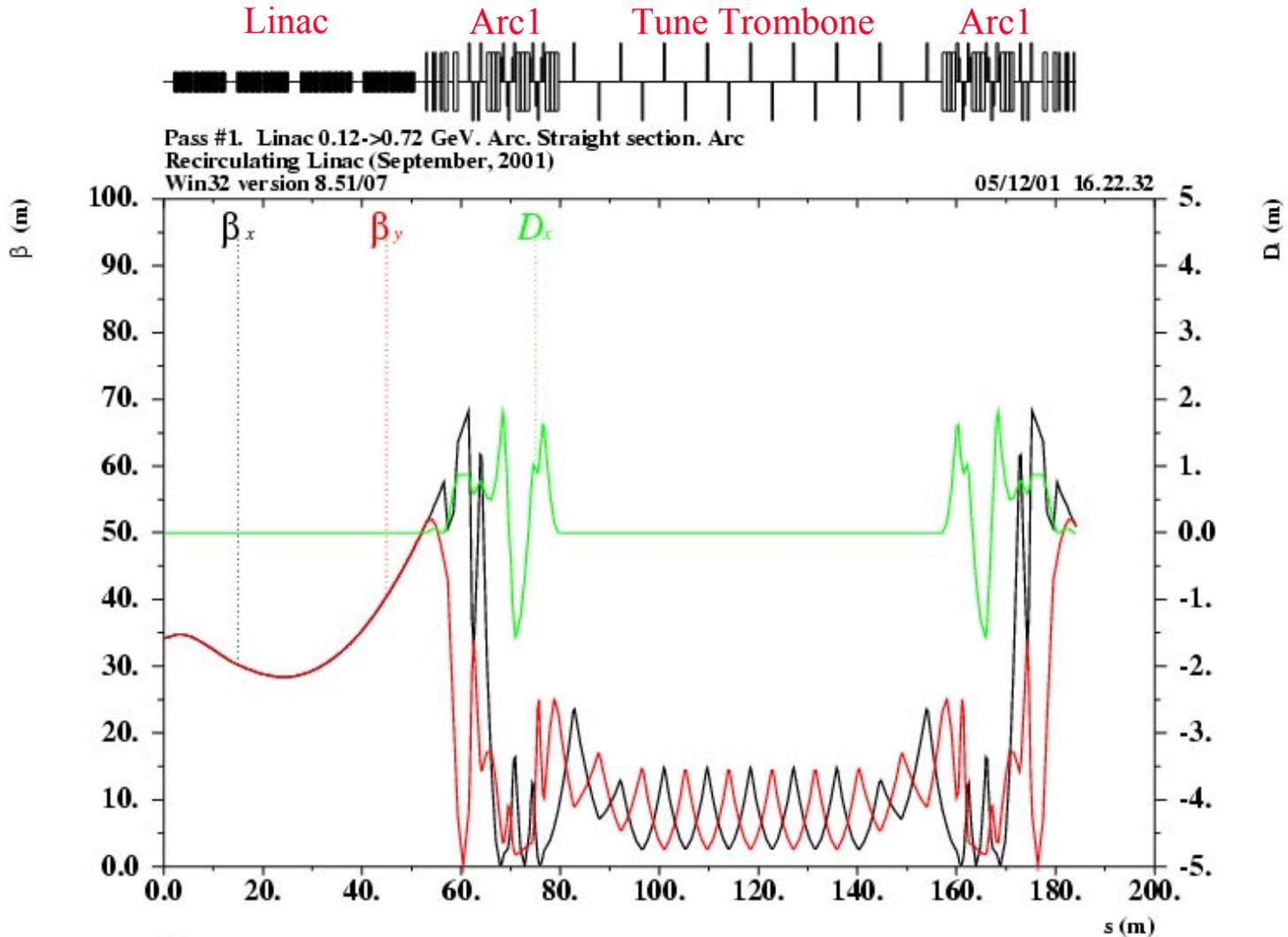
Note: Injection lattice not included.

Arcs and Beam Spreaders





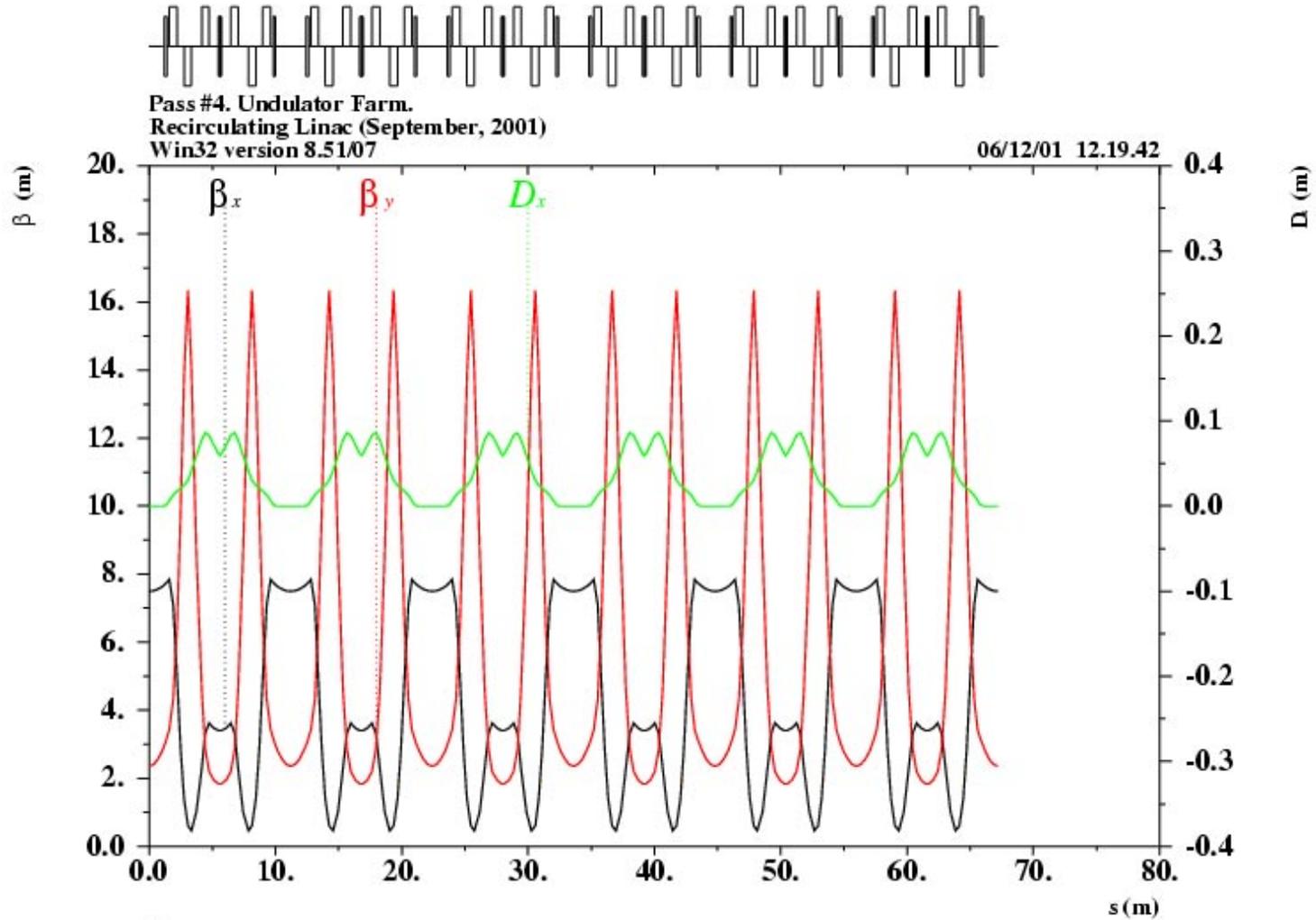
Lattice Functions (Ring1)



$\delta z / p_0 c = 0.$

Table name = TWISS1

Lattice Functions (Undulator Farm)



$\delta_{\tau} / p_0 c = 0.$

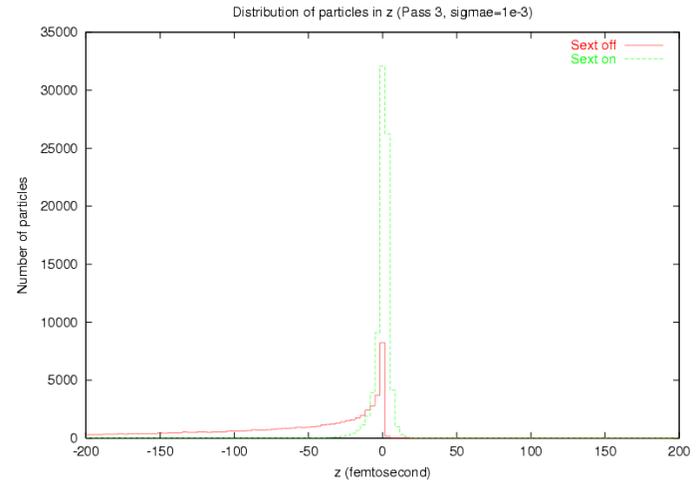
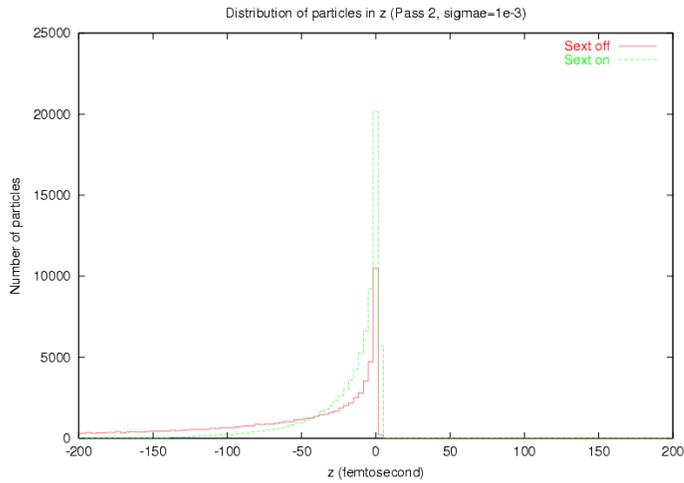
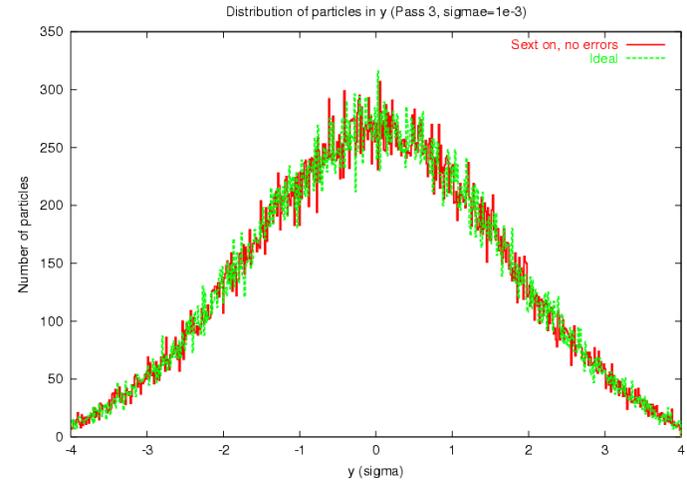
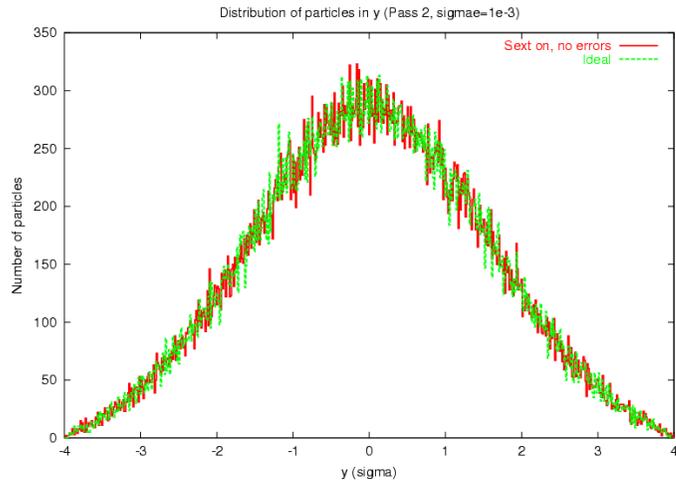
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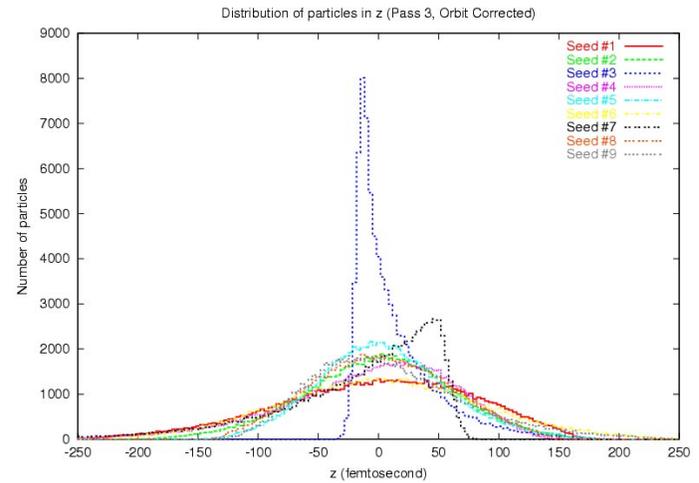
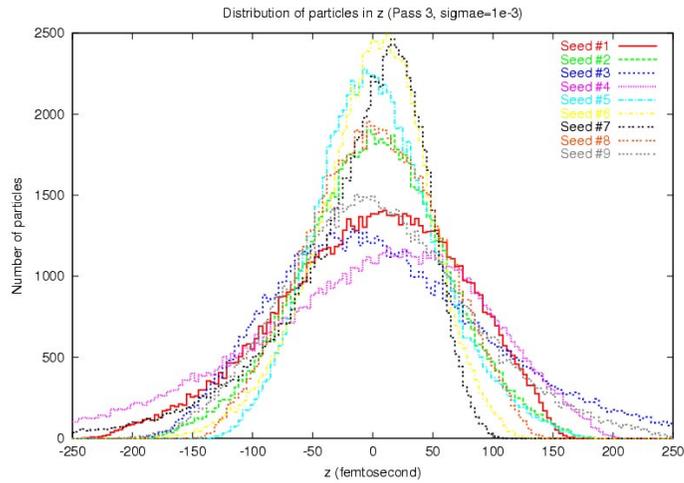
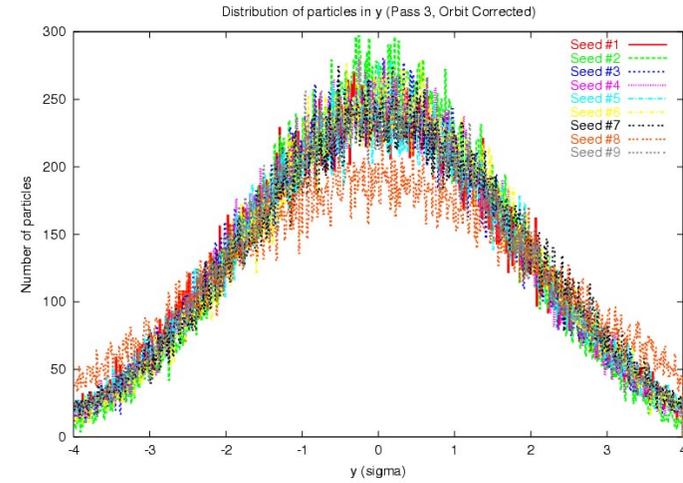
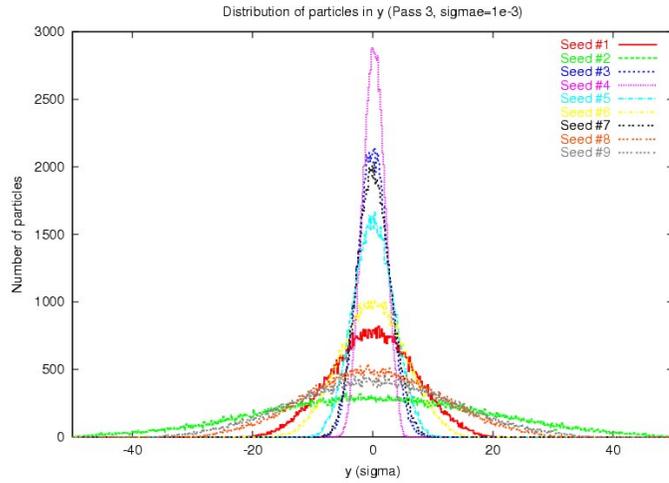
Status of Lattice Studies

- **Layout and design of linear lattice has been completed**
 - Only fine tuning may be necessary in the future
- **Chromatic effect of the arcs studied**
 - 2nd-order terms dominate bunch lengthening
 - Sextupoles correct those terms effectively
 - No significant change in transverse emittance
- **Influence of the errors in the arcs studied**
 - Magnet setting errors, multipole components and misalignment included
 - For certain cases, vertical beam size is sensitive to vertical orbit when sextupoles are turned on
 - Orbit correction proves effective in preserving emittance
 - Tracking code of the entire lattice has been developed

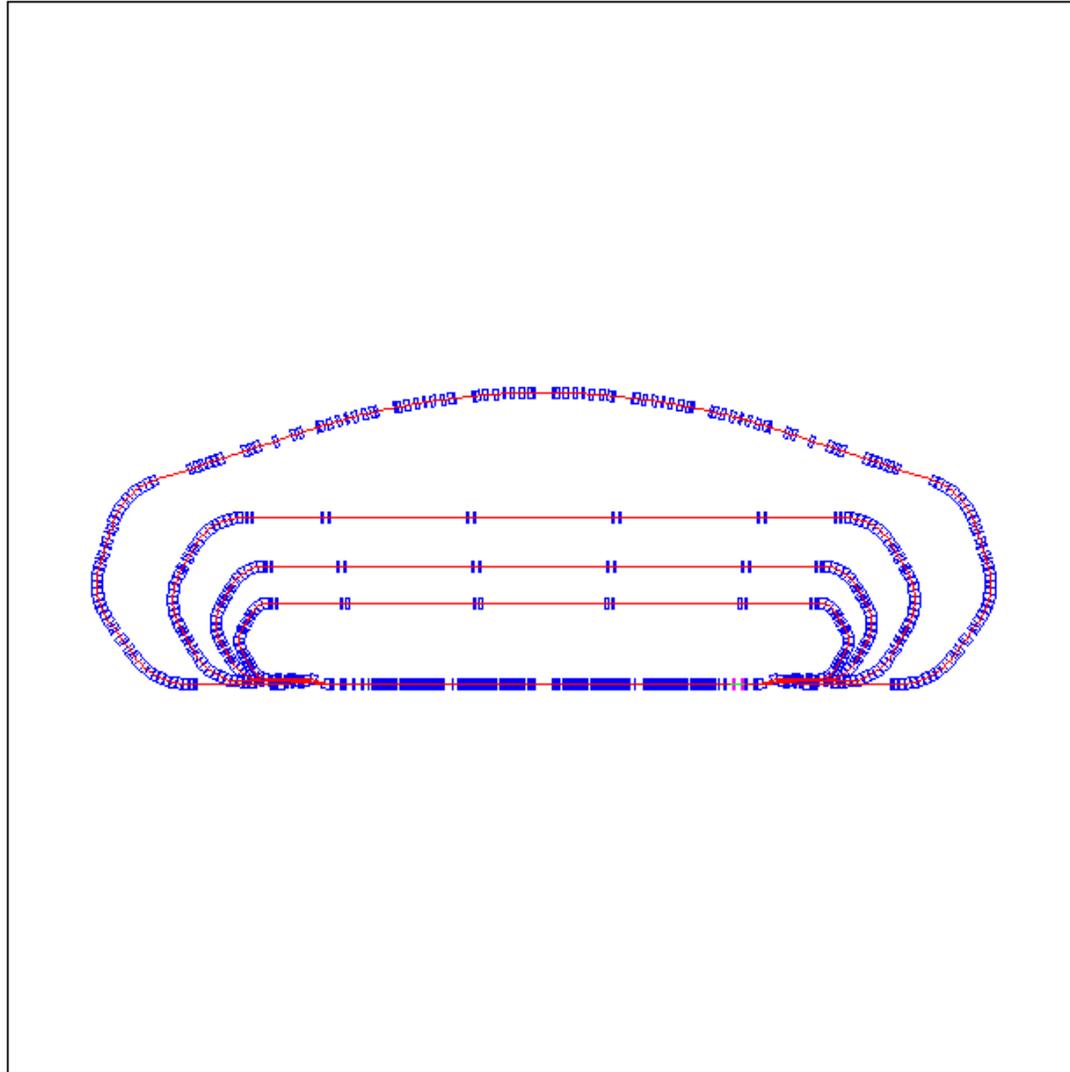
Chromatic Correction



Effect of Errors and Orbit Correction



Layout Generated from Etienne's Code





Plan for CDO

- **Tracking the entire lattice with errors and orbit correction**
 - Include other errors such RF phase and energy jitter
 - Include deceleration and Crab cavities
 - Finish coding
 - 4-5 weeks of 1 FTE
- **Correction schemes with realistic BPM**
 - Orbit correction
 - Linear correction, possibly Model Independent Analysis
 - 2-3 months of 1 FTE
- **Generation of an engineering lattice**
 - Will reserve slots for all the gadgets
 - 2-3 weeks of 1 FTE
- **Documentation**
 - 3-4 weeks of 1 FTE