TRANSFER LINES DESIGN

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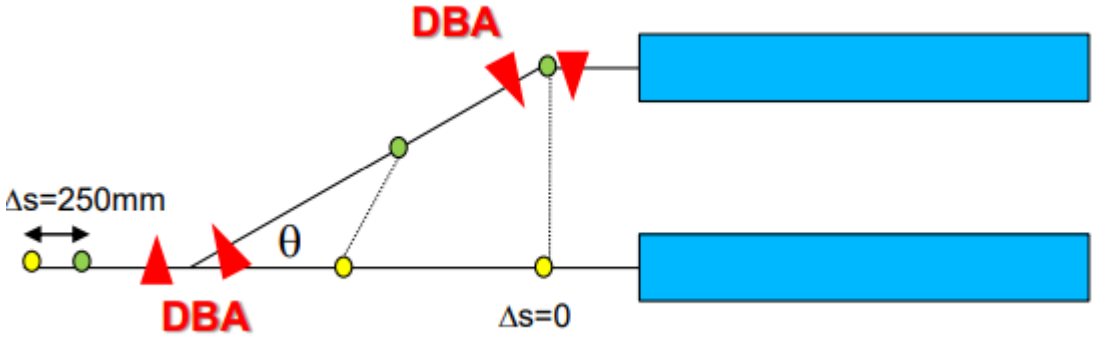
Outline

- Requirements
- Preliminary studies of Dogleg layouts
- Optical parameters for Dogleg
- Simulation results
- Conclusion

The requirements

The main consideration in this presentation come from the discussion from

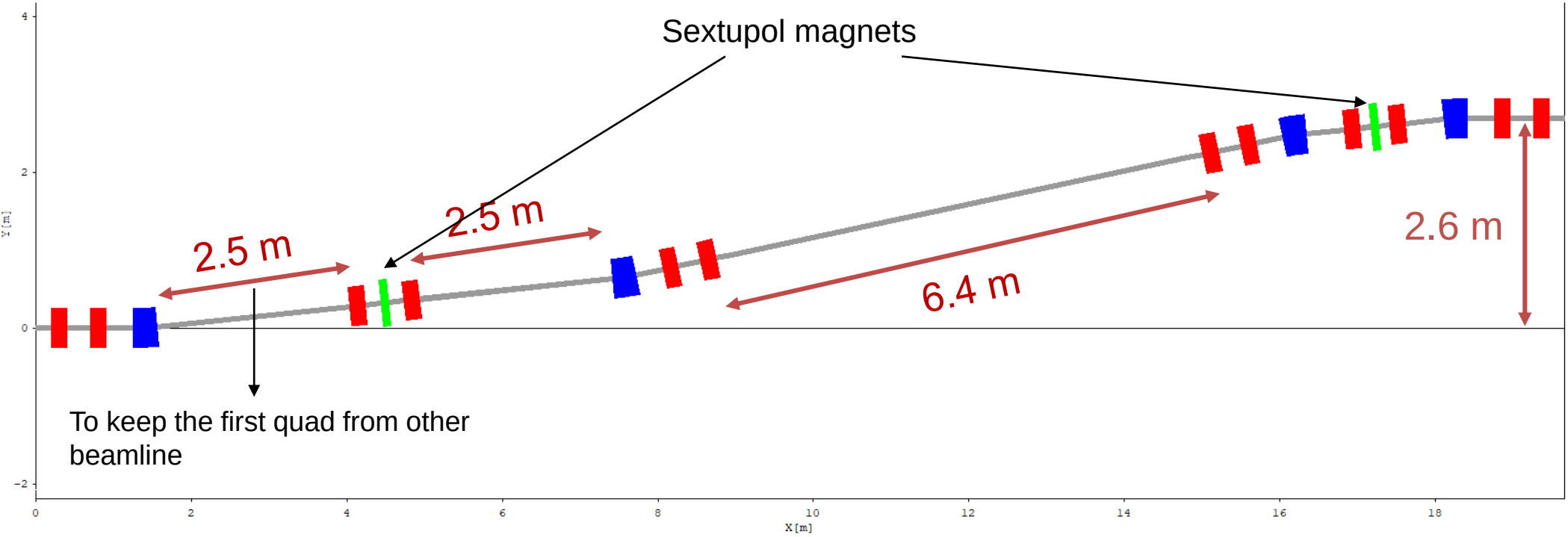
FEL Separation meeting:
https://indico.cern.ch/event/933999/



From S. Di Mitri's presentation

6 degree for each dipole, 2.4 m seperation of the FEL lines and 11 m drift length (would include delay chicane)

LAYOUT 1: Non symetric

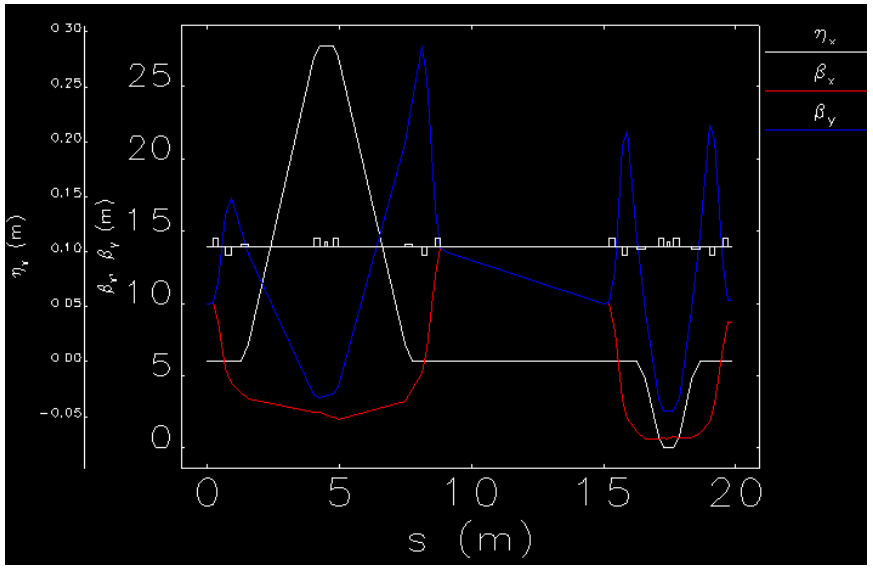


Bending magnet: length=0.3 m, Bending Angle= 6 deg

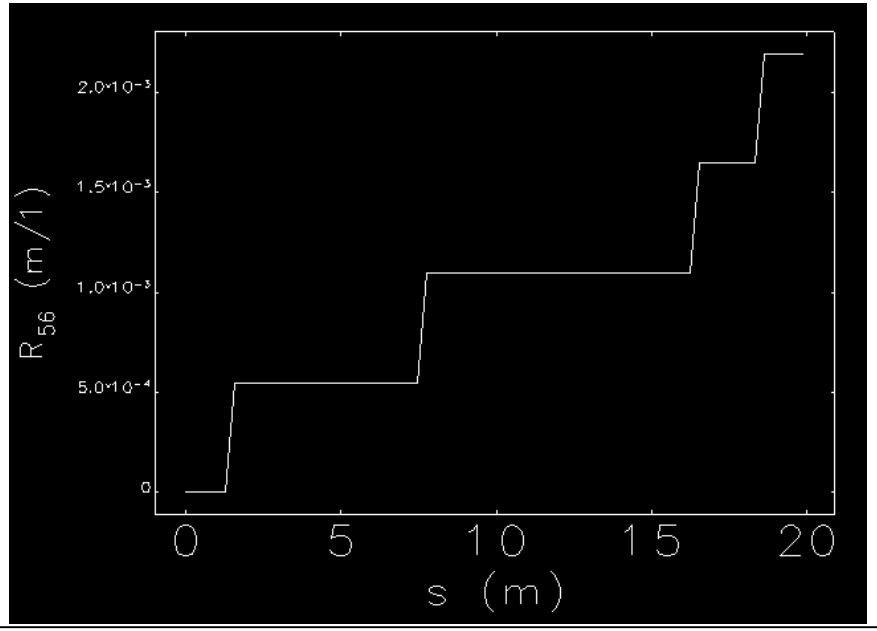
Quadrupoll width assumed 0.5 m

where Δs=236 mm

Beamline combination of DBA lattices

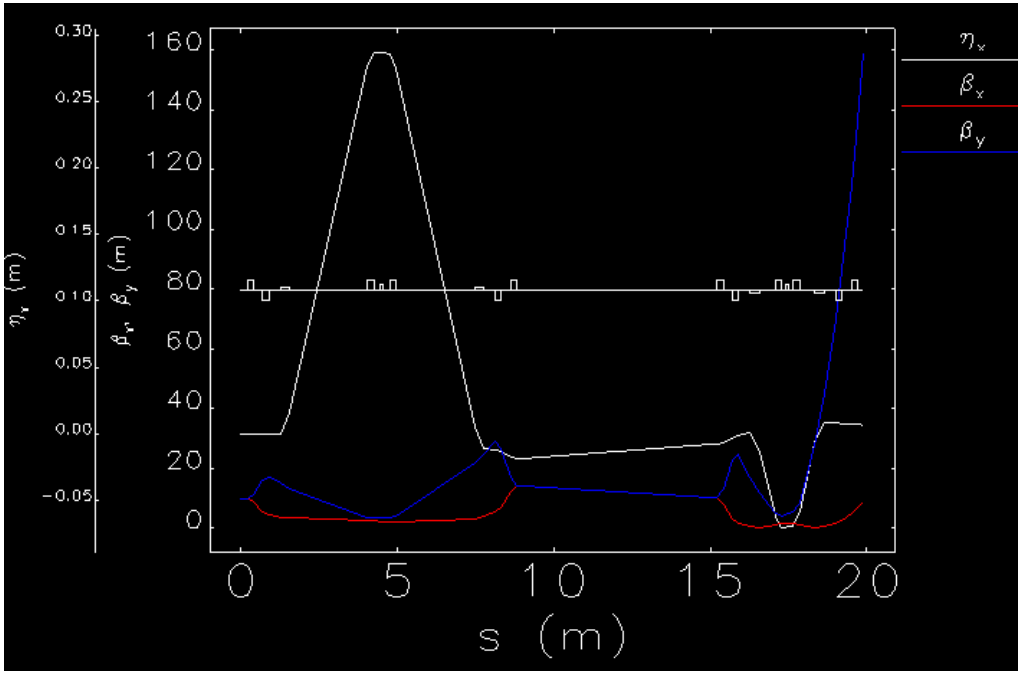


The transfer line constructed of two Double bending achromat (DBA) lattices.
Control of Dispersion is easy.



The R56 which is strongly related by bunch length increasing step by step.
However:
The incoming bunch would have the final paremeter and We would need to keep bunch length constant

Optical parameters to control the R56

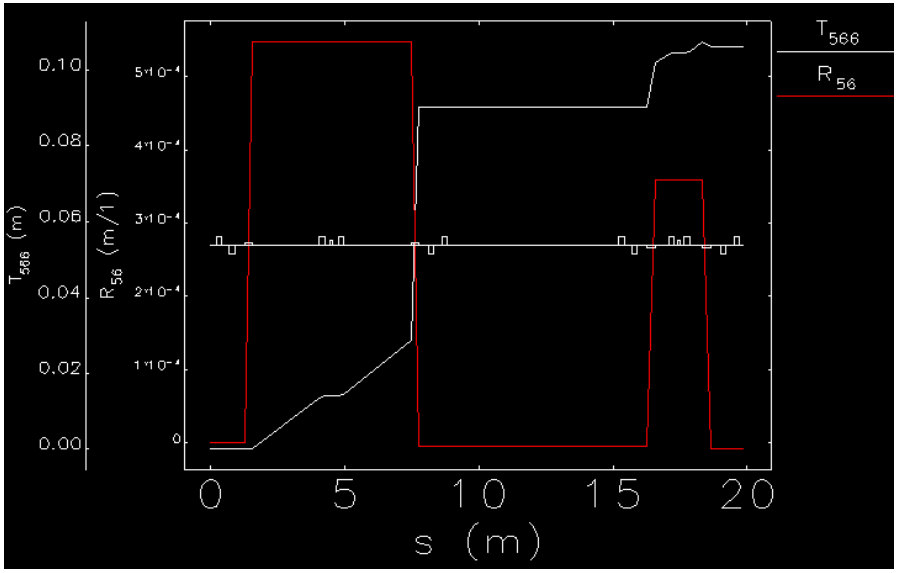


By changing the quadrupol strength the R56 can be changed.

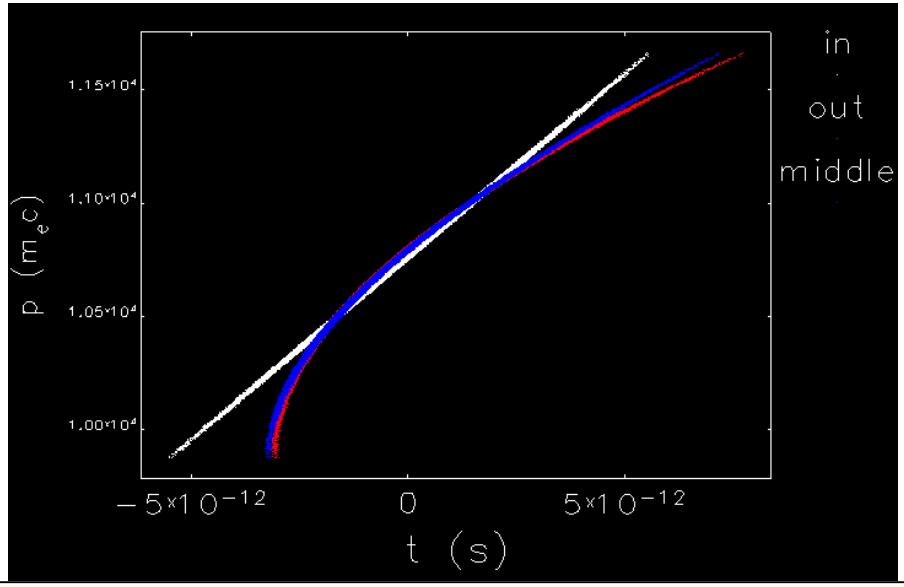
Our DBA's are not achromatic anymore

Optical parameters of dogleg transfer line

Without sextupol magnets

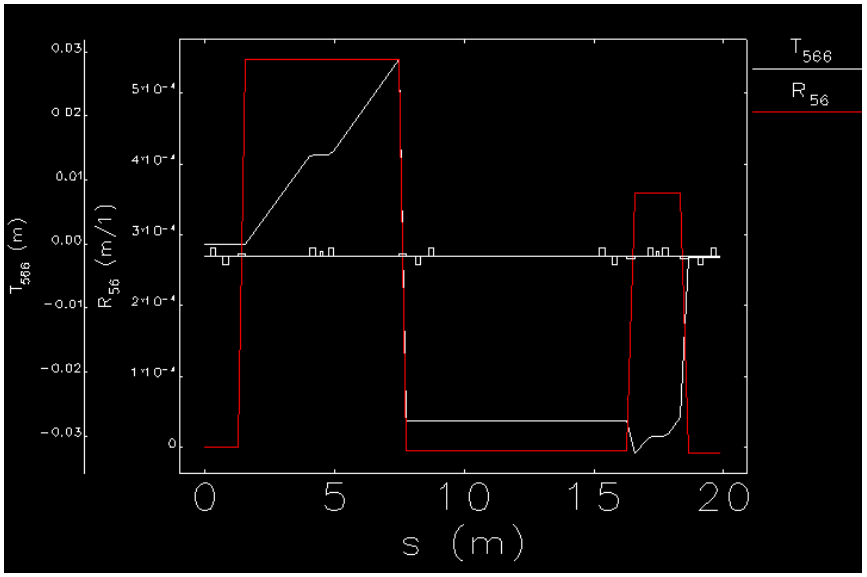


Evolution of longitudinal dispersion along the beam line without sextupole



The beam in phase space at the entrance, middle and exit of the beamline (White entrence, red exit and blue middle)

With sextupol magnets



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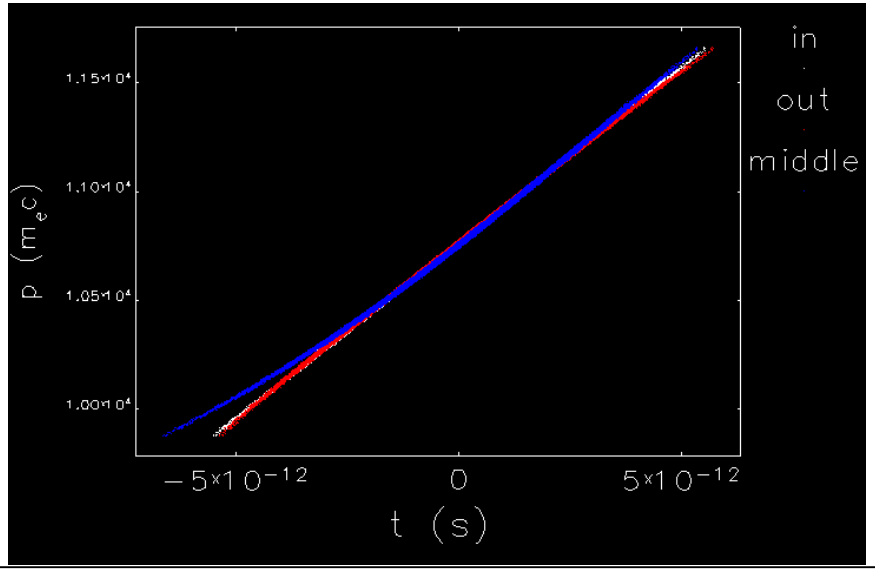
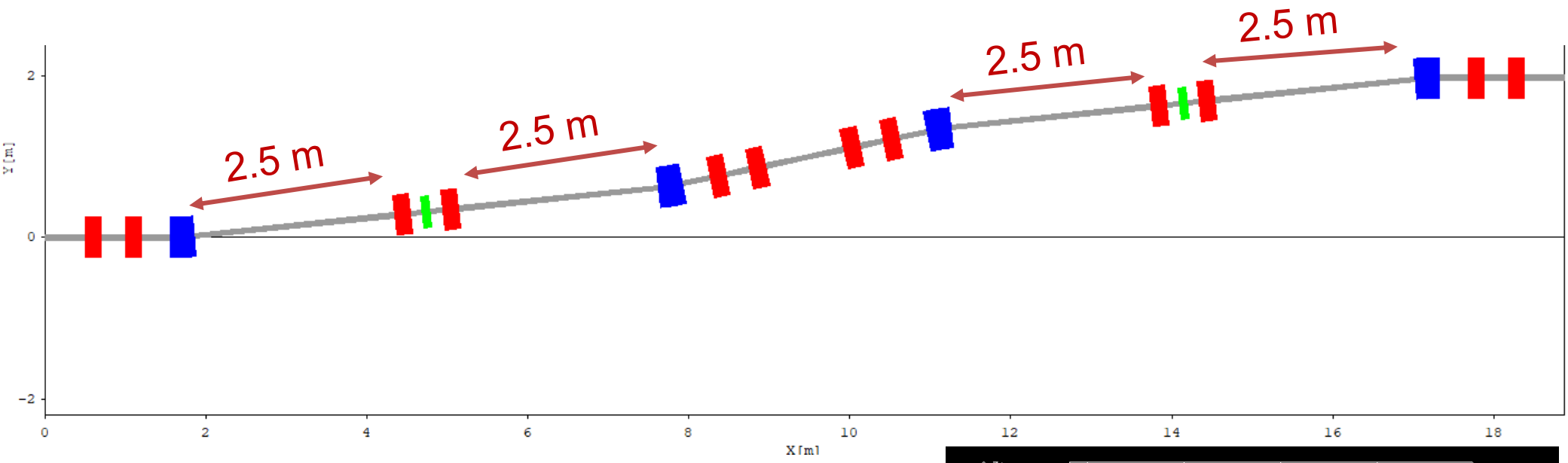


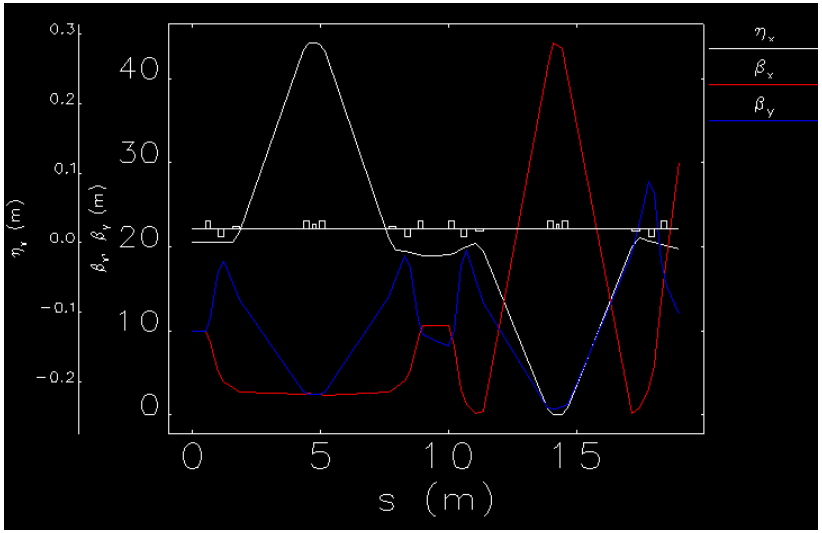
The beam in phase space at the entrance, middle and exit of the beamline (White entrence, red exit and blue middle)

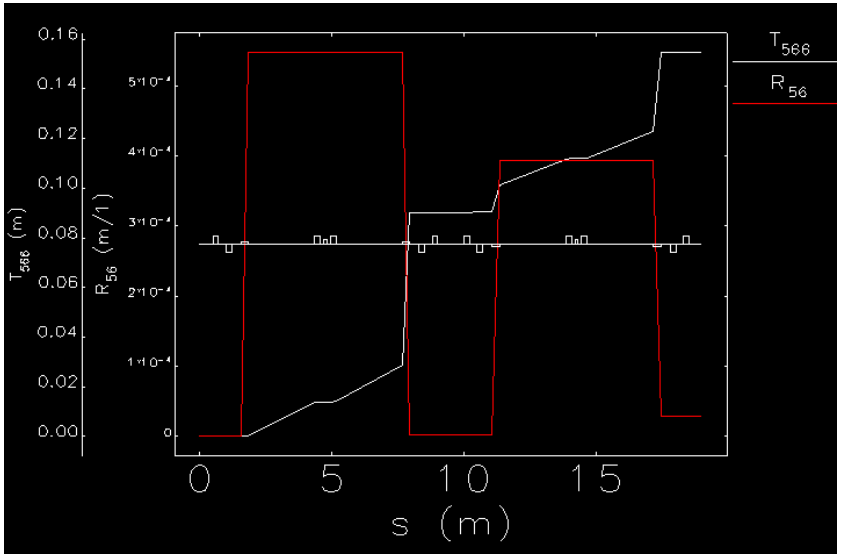
Symetric beamline



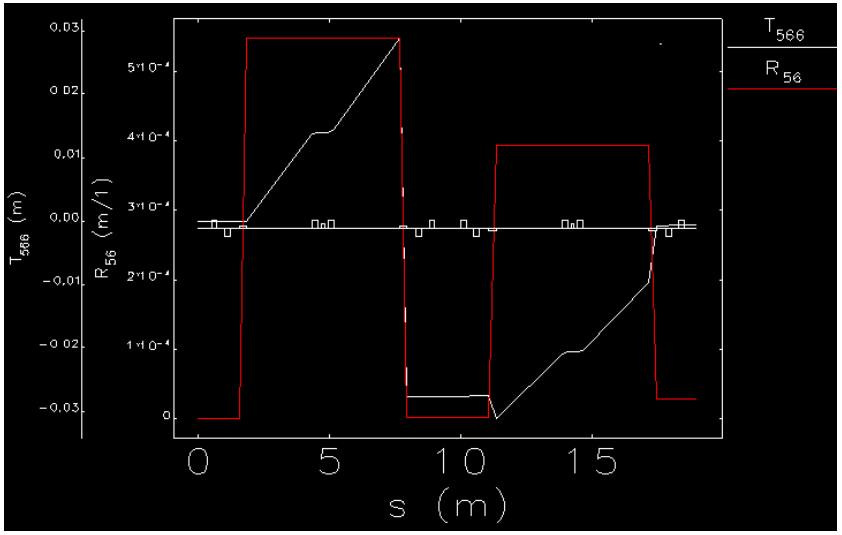
The drift in middle is extracted.

Δs=140 mm
The seperation of FELs is 2 m





Evolution of longitudinal dispersion along the beam line without sextupole



Evolution of longitudinal dispersion along the beam line with sextupole

Conclusion

The study on dogleg layout and related accelerator parameters are in progress.

The CSR effect does not included yet.

The CSR effect will start in short term with more realistic beam.

Funded by the
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Thank you!

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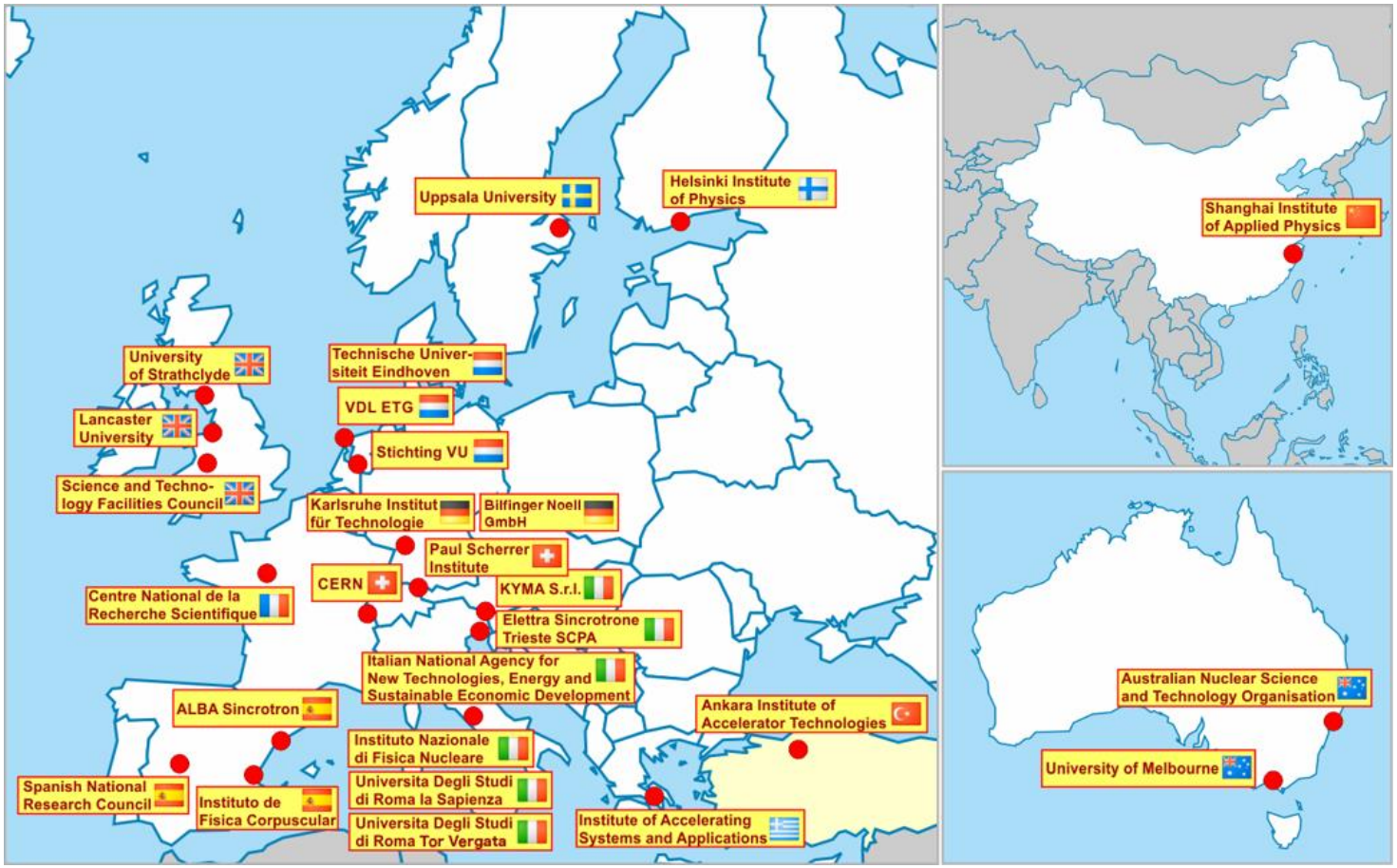

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