BDS Design : Central Integration

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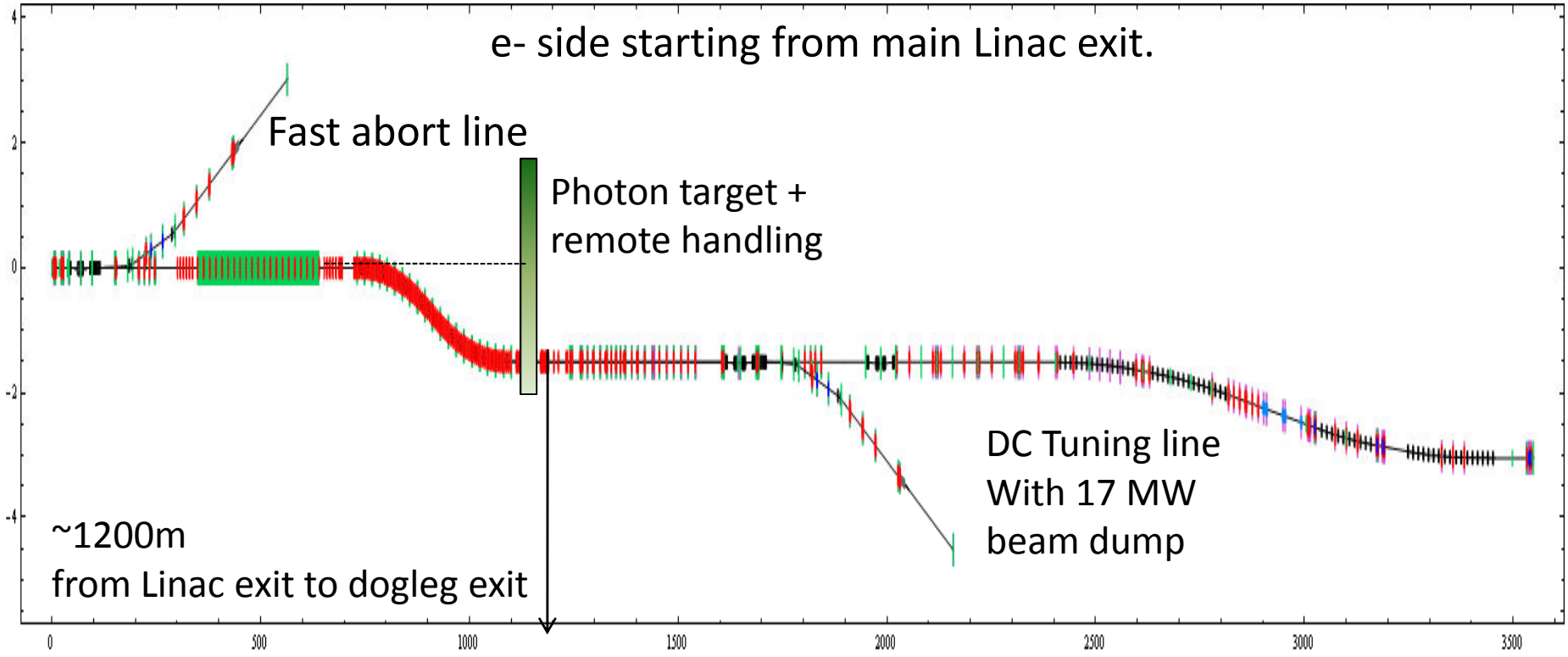
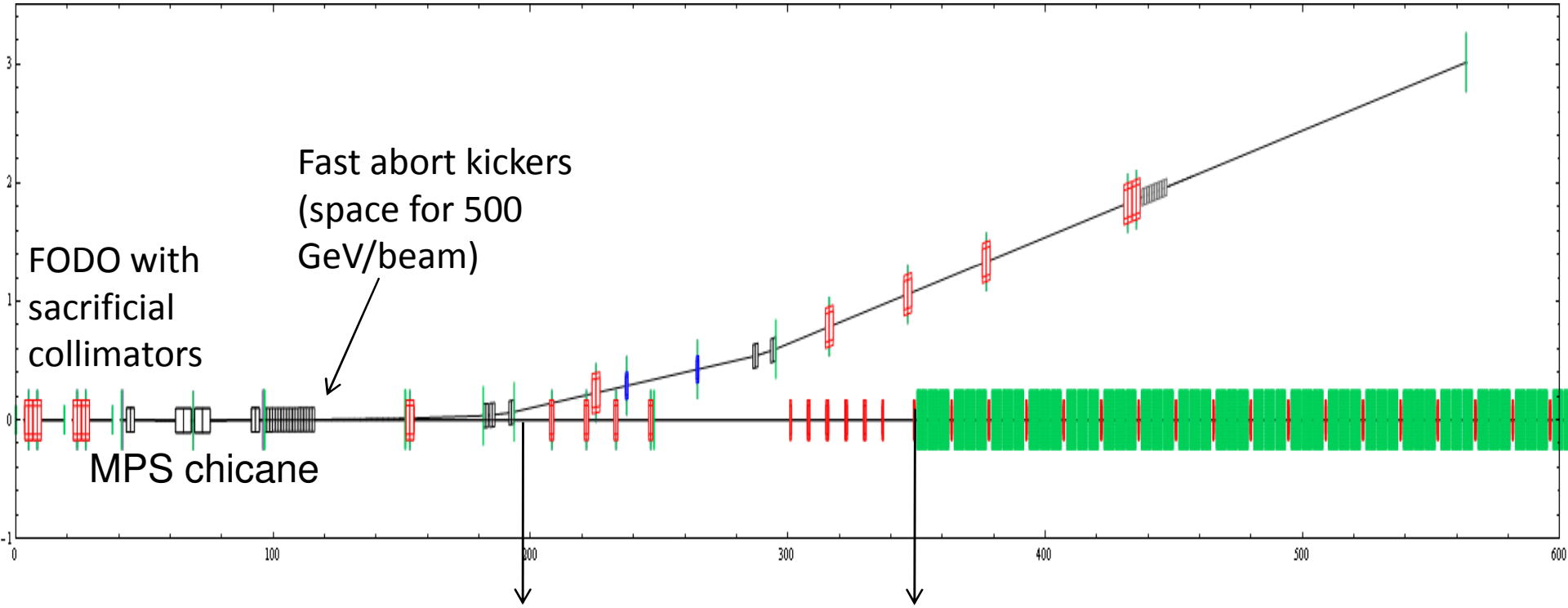
Central Integration : BDS Design Changes



Sacrificial collimator section moved before undulator but additional chicane for laser wire photon detection is included. If degraded electrons can be used for LW this chicane can be removed on e- side but fast abort chicane will be required on e+ BDS side.

DC tuning line can be shorter (not yet designed). Instead of fast abort Kicker(length=2m and field ~0.13T, a stronger DC magnet can probably be used provided the emittance increase is allowable for tuning purposes.

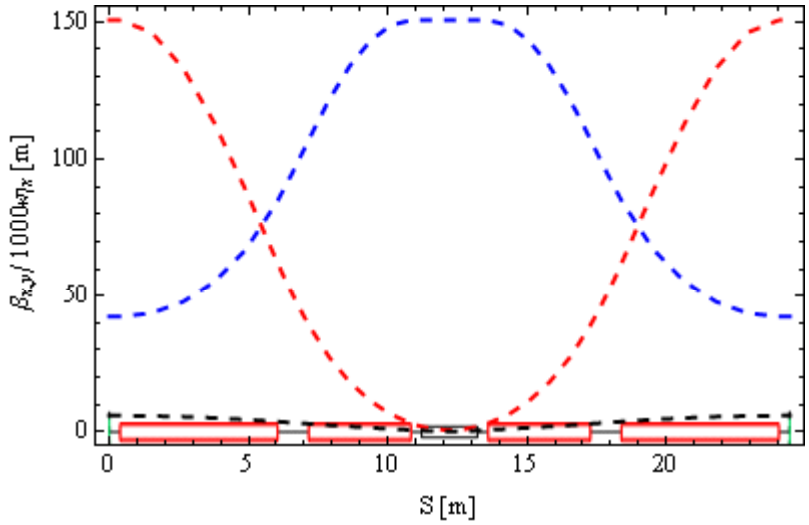
Fast abort area



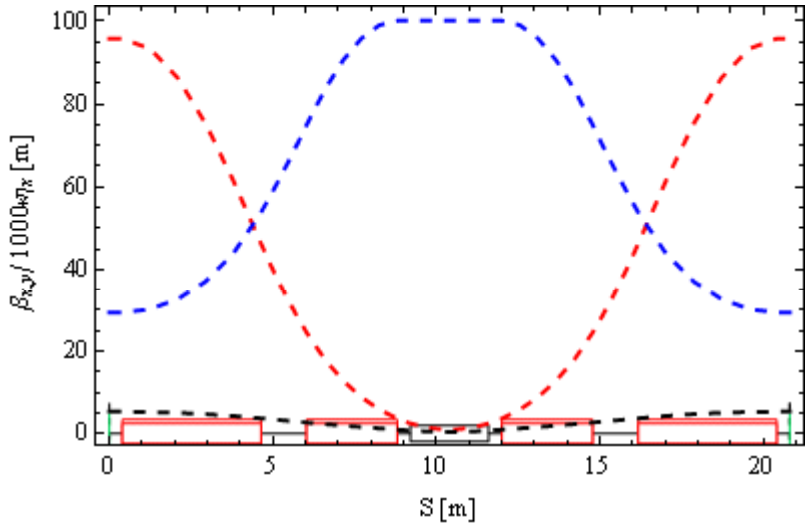
~175m. Need space only for matching to undulator FODO but the transverse separation should be enough for undulator modules. Can this 175m be further reduced?

Dogleg Theoretical Minimum Emittance (TME) Designs

40Tm Optics



60Tm Optics



- Reduced Quadrupole field leads to longer arc length, as well as longer quadrupoles
- This raises the required dipole field.

Dogleg Design Parameters

Element	40Tm Design	60Tm Design
Bend Angle	1.1mrad	1.02mrad
Focus. Quad L	5.64m	4.23m
Defocus. Quad L	3.66m	2.77m
Smallest Drift L	0.4m	0.4m
Cell Length	24.44m	20.84m
No. Cells	7	6
Number of Elements	64 Quads / 16 Dipoles	72 Quads / 18 Dipoles
Emittance Growth (250/500GeV)	5.77nm / **367nm**	3.69nm / **236nm**

$\gamma\varepsilon_{x0}$= 1E-05=10^4 nm

- Decide power of fast abort dump. Acceptance of fast abort line (-15-20% to +1%)?
- Design of DC tuning line, how strong dipoles can be used for this line? Can leave space for dipoles for 1TeV upgrade.
- Space optimisation of section between linac exit – undulator start.
- Will have these two designs by ALCPG.
- Timing issues with e+ and e- BDS. Is symmetric drift (if necessary : replace with FODO) necessary on e+ BDS side?
- RDR design has BDS excursion in tunnel, check the layout for new offset BDS.
- Crossing angle layout: Changes in configuration for gamma-gamma?
- Have not shorten the RDR deck yet, it may save ~100-200m of space.