Betatron and momentum collimation in same LSS ?

ESS length : 4.2km

Betatron collimation section length : 2.7km → 1.5km for momentum collimation

In momentum collimation section ~1.1km needed for collimators installation.

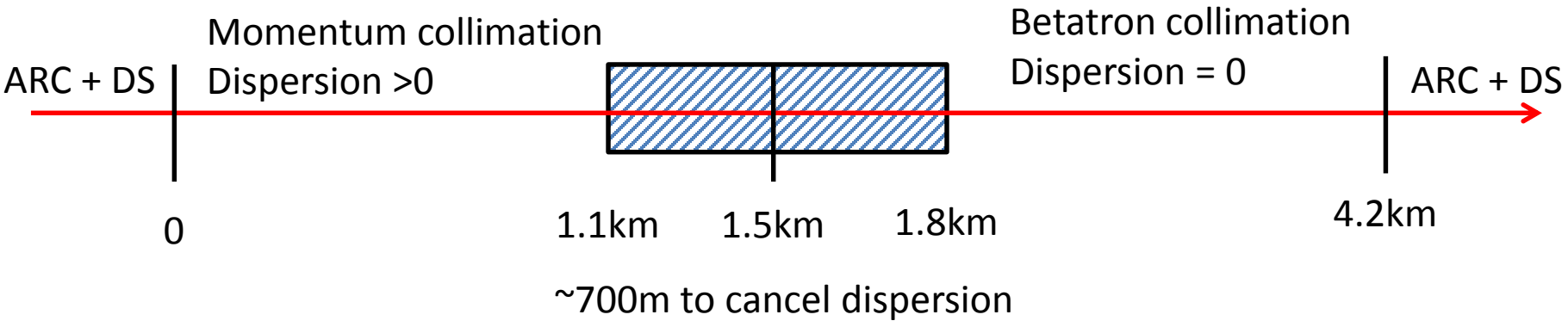
→ 400m remaining for dispersion management

+400m (300 + 100m) coming from betatron section

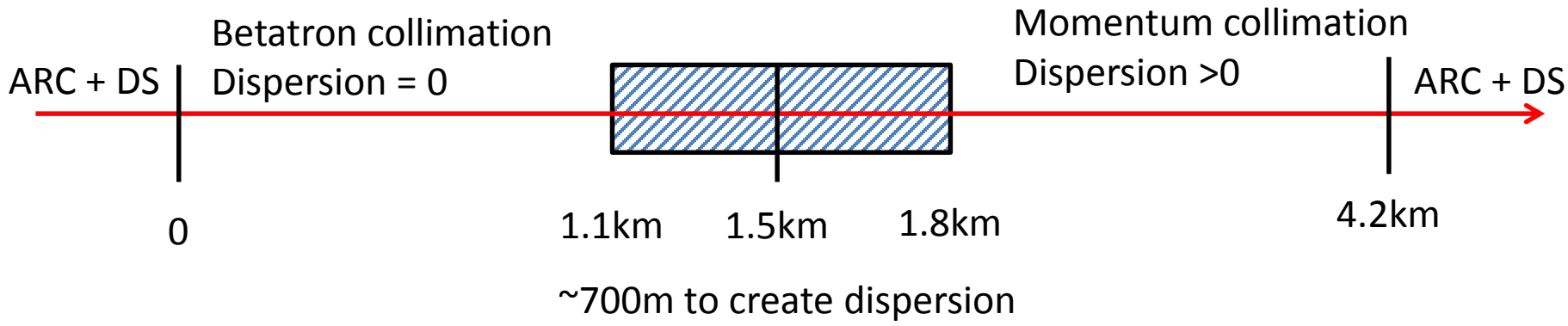
→ ~700m between momentum and betatron section to cancel/create dispersion.

Which layout ?

- **First option** : dispersion coming from arc used for momentum collimation then cancelled before betatron collimation



- **Second option** : No dispersion at exit of arc for betatron collimation then chicane to create dispersion for momentum collimation



First optics tests…

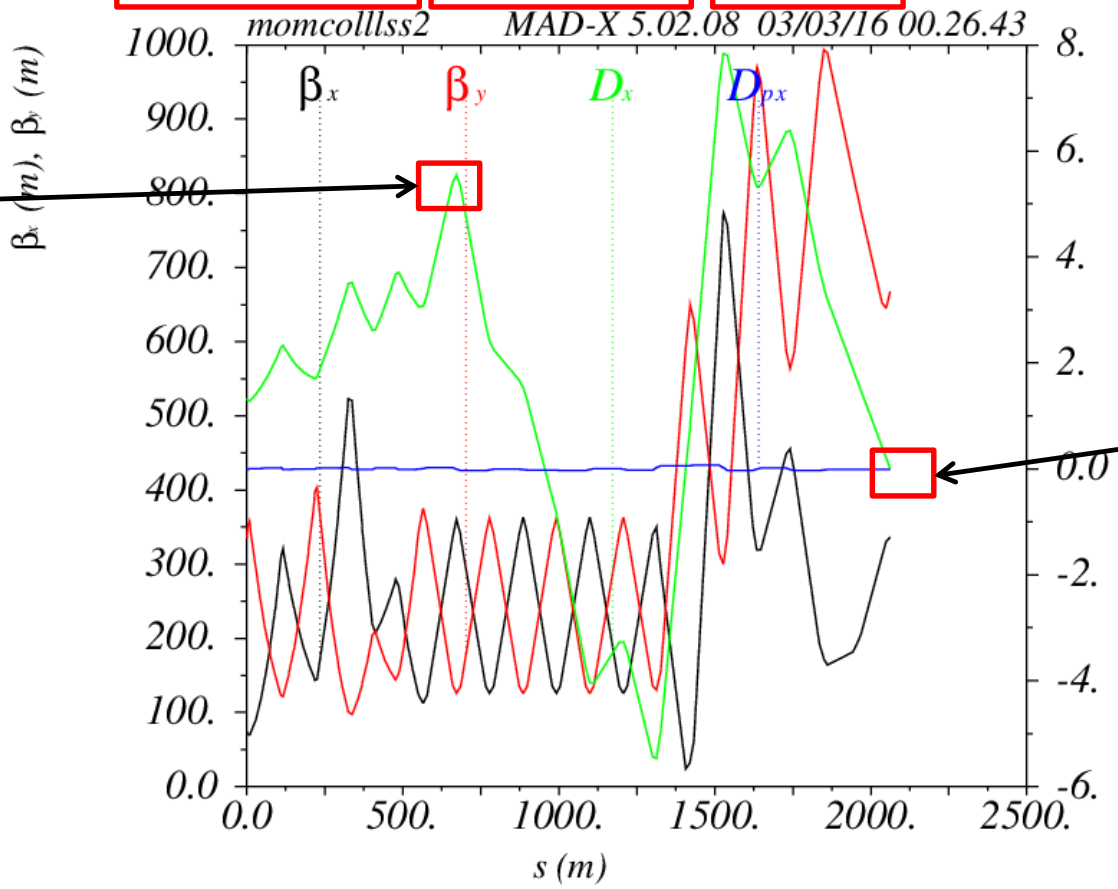
First test on option one : momentum collimation followed by betatron one.
No particular problem to integrate momentum and betatron collimation sequences into 4.2km.
First matching tests made only with quads, no additional dipoles at this time.

Dispersion suppressor

Fodo section for momentum collimation

Matching section to betatron collimation

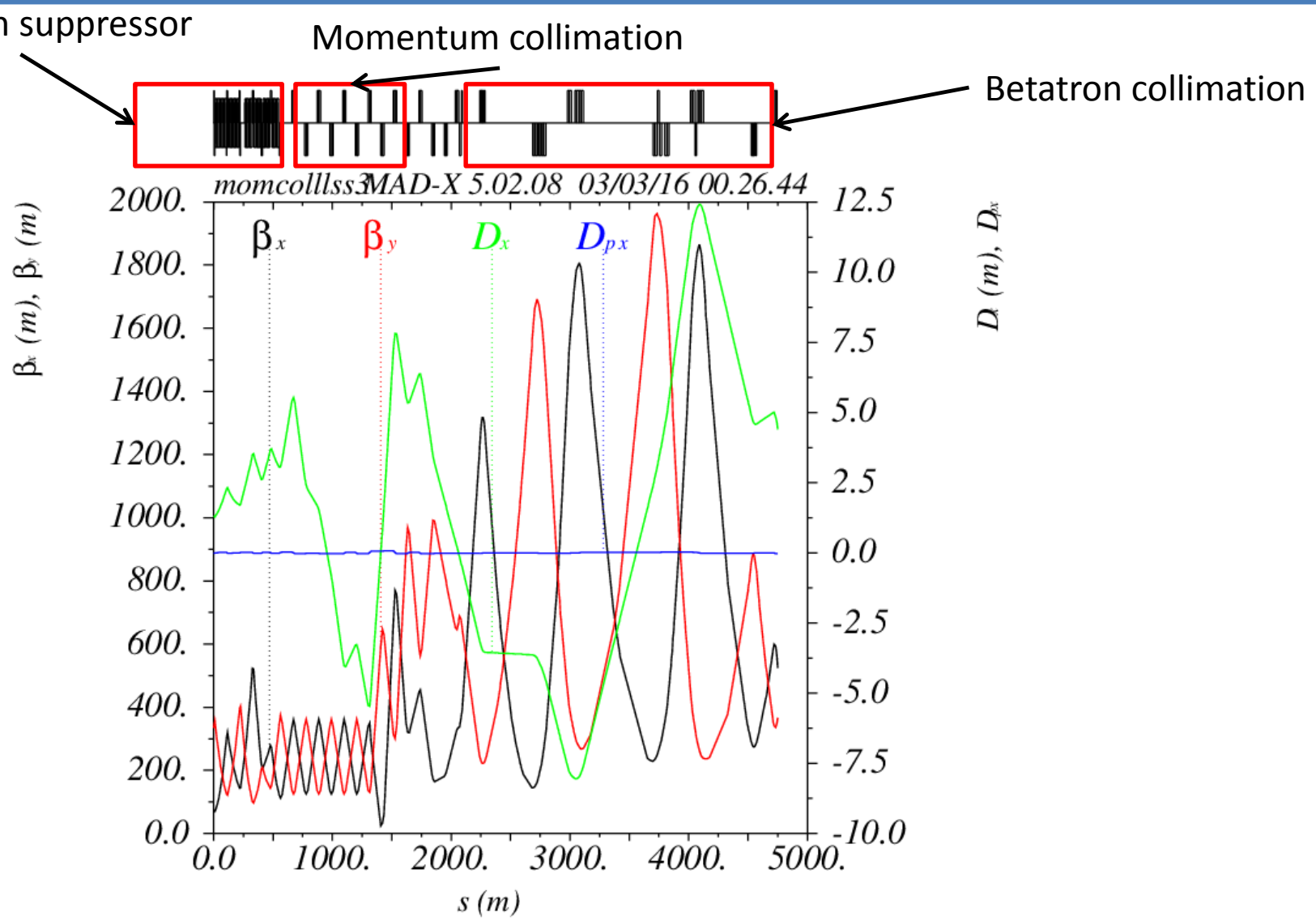
5.2m Dx at primary collimator



At exit :
Dx = 0
D'x= $-1.6.10^{-2}$

First optics tests…

D'x at exit of momentum section is too big and leads to huge dispersion in betatron section.
Not possible to decrease it enough only with quads.
Aditional dipoles to be installed but integration has to be checked carefully.



- First test of momentum + betatron collimation in same LSS have been done
- First optics tests do not show insurmountable issues
- Dispersion still too big in betratron section
- Possibilities exist to improve dispersion but general integration has to be taken into account carrefully.