



# Injection schemes for plungers run

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- 1) Measure beam at BTV.430042 and perform tomographic reconstruction
- 2) Extract Twiss from distribution and use as input
- 3) Numerical optimisation
  - Variables are strengths in first and last triplet
  - Objective function in combination of goal parameters ( $\alpha_x=\alpha_y=0$ ,  $\sigma_x=\sigma_y=200$  um,  $D_x=D_y=0$ )
  - Optimisation performed for each optics.

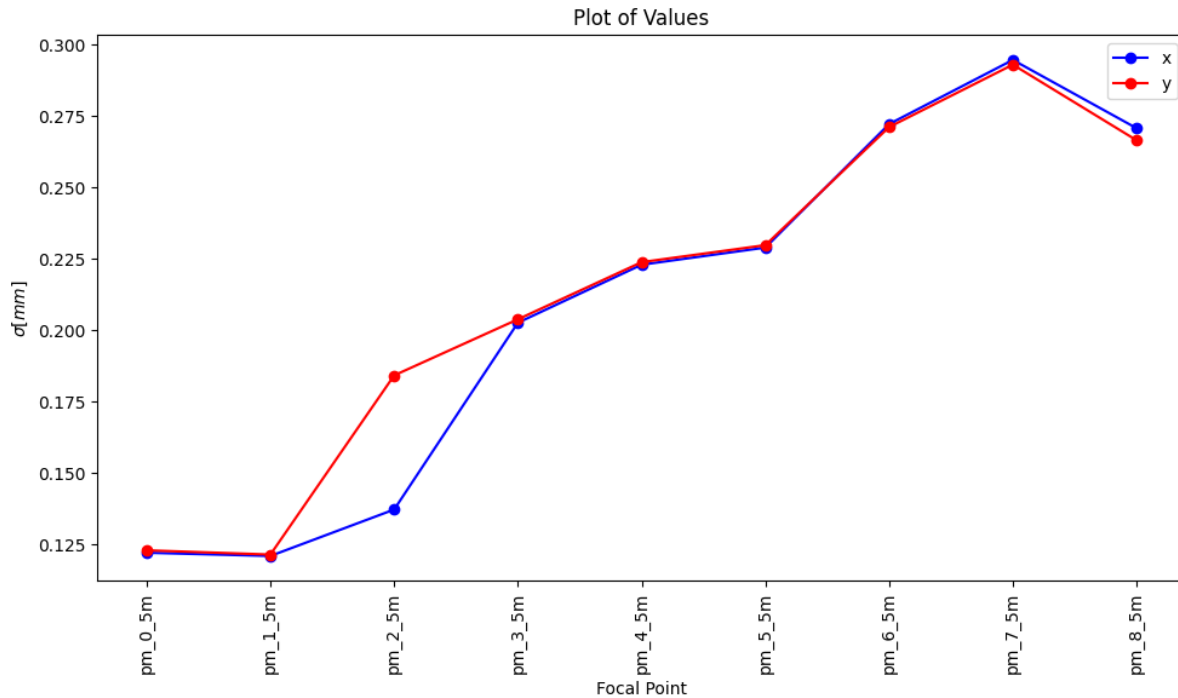
**N.B.** Change in input beam condition has considerable effect on beta functions along the line!

Comments: optimisation until now performed considering 200 um as goal size.

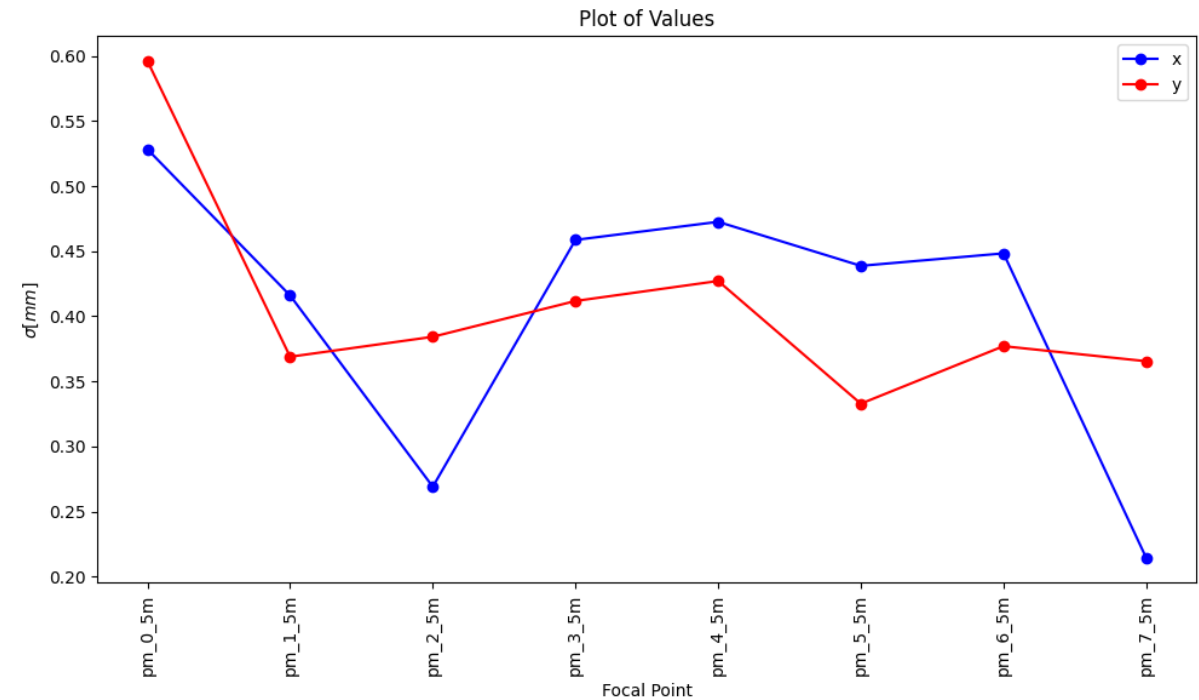
# New injection optics

- Plungers position at 0.5 m after iris and 1 m distance later on.
- New optics designed for this requirements.
- Improved beta functions simmetry

### Beam size at waist

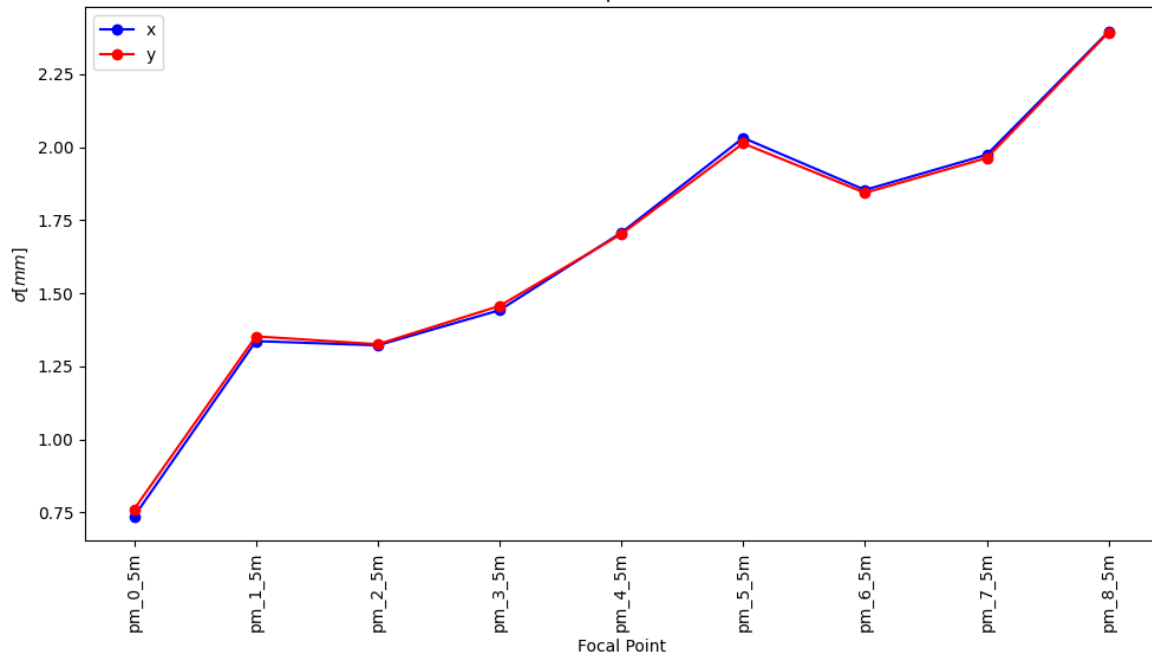


### Beam size 1m before waist

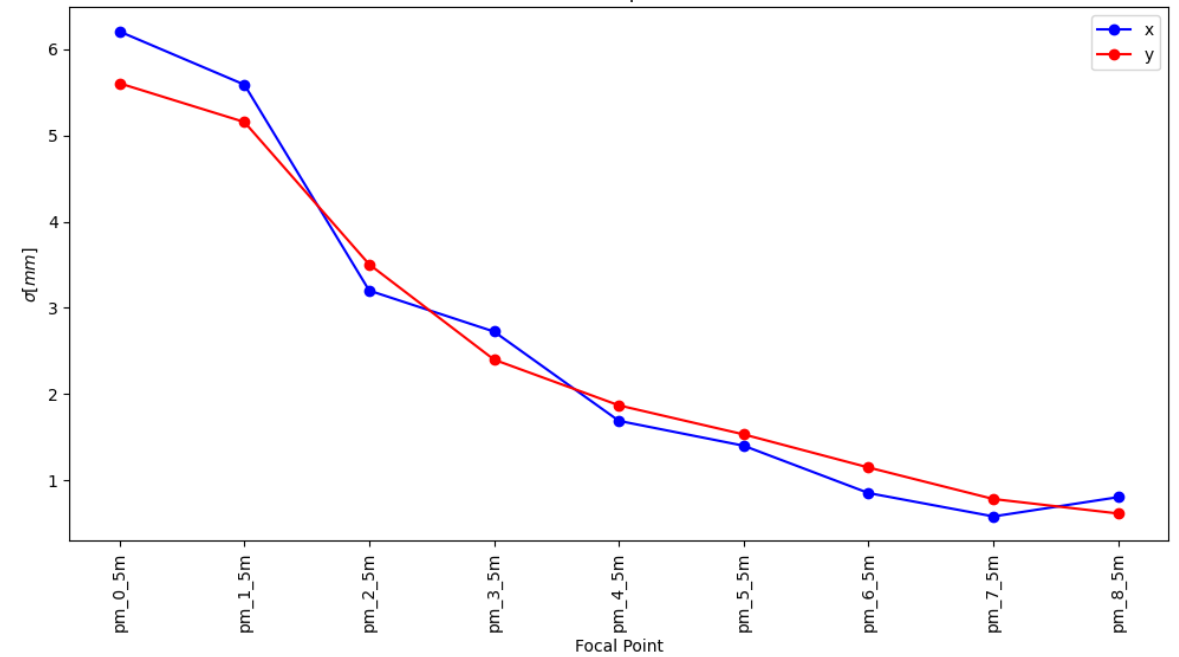


# New injection optics

Beam size at plasma entrance

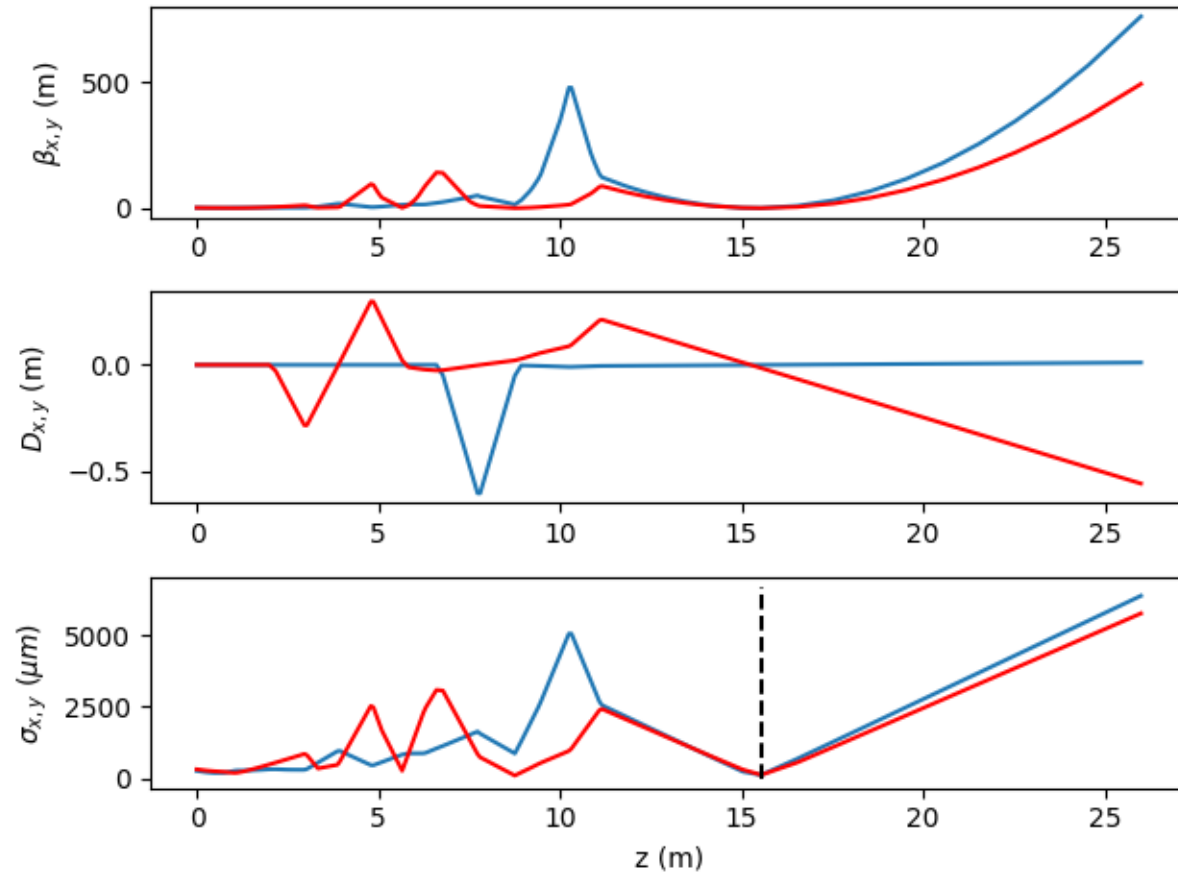


Beam size at plasma exit



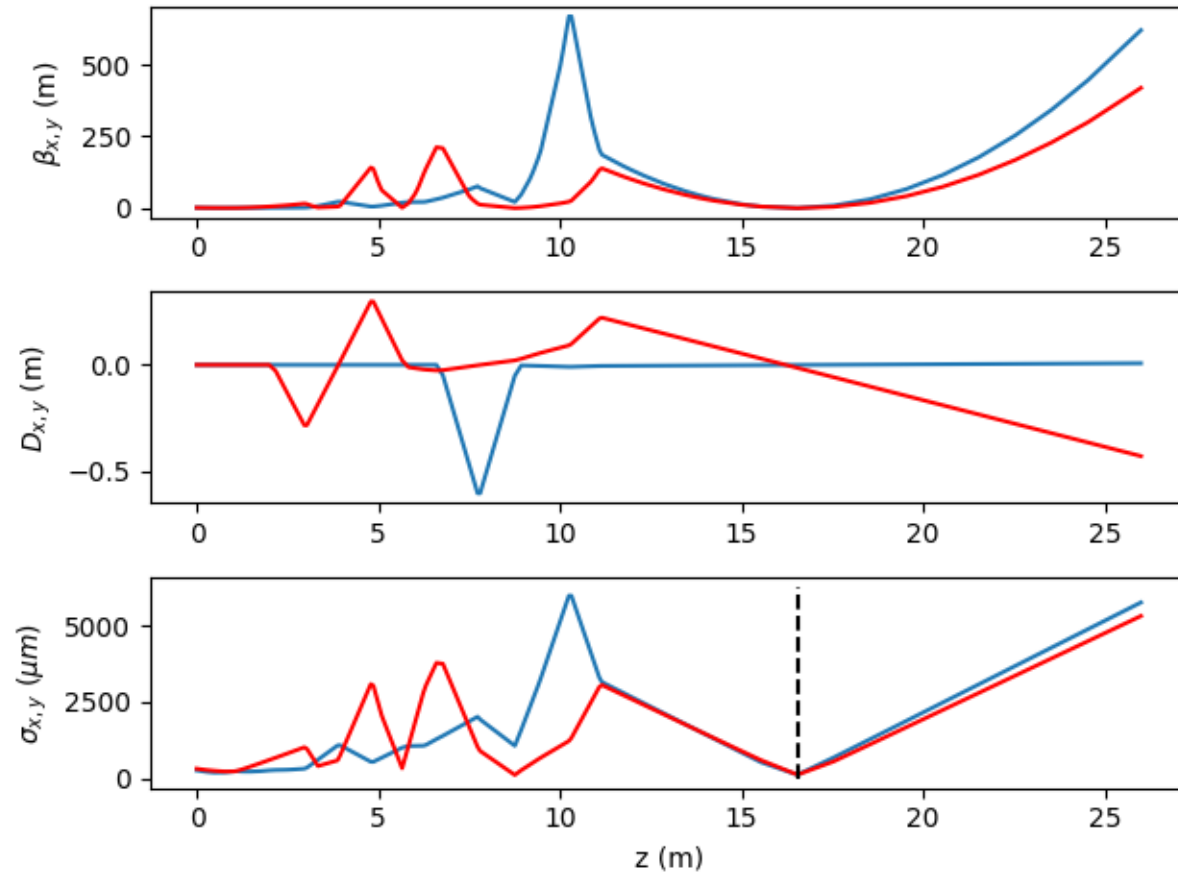
# New injection optics

Focal point = 0.5 m



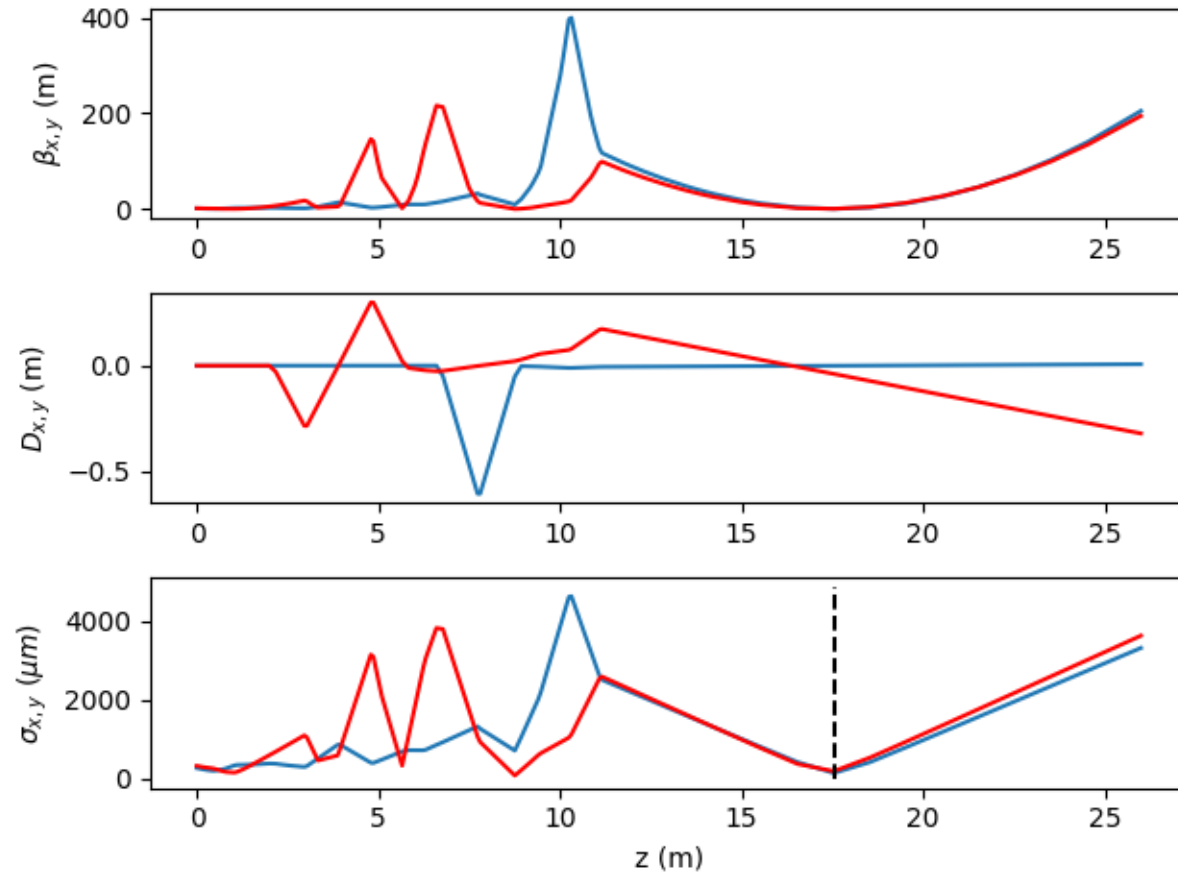
# New injection optics

Focal point = 1.5 m



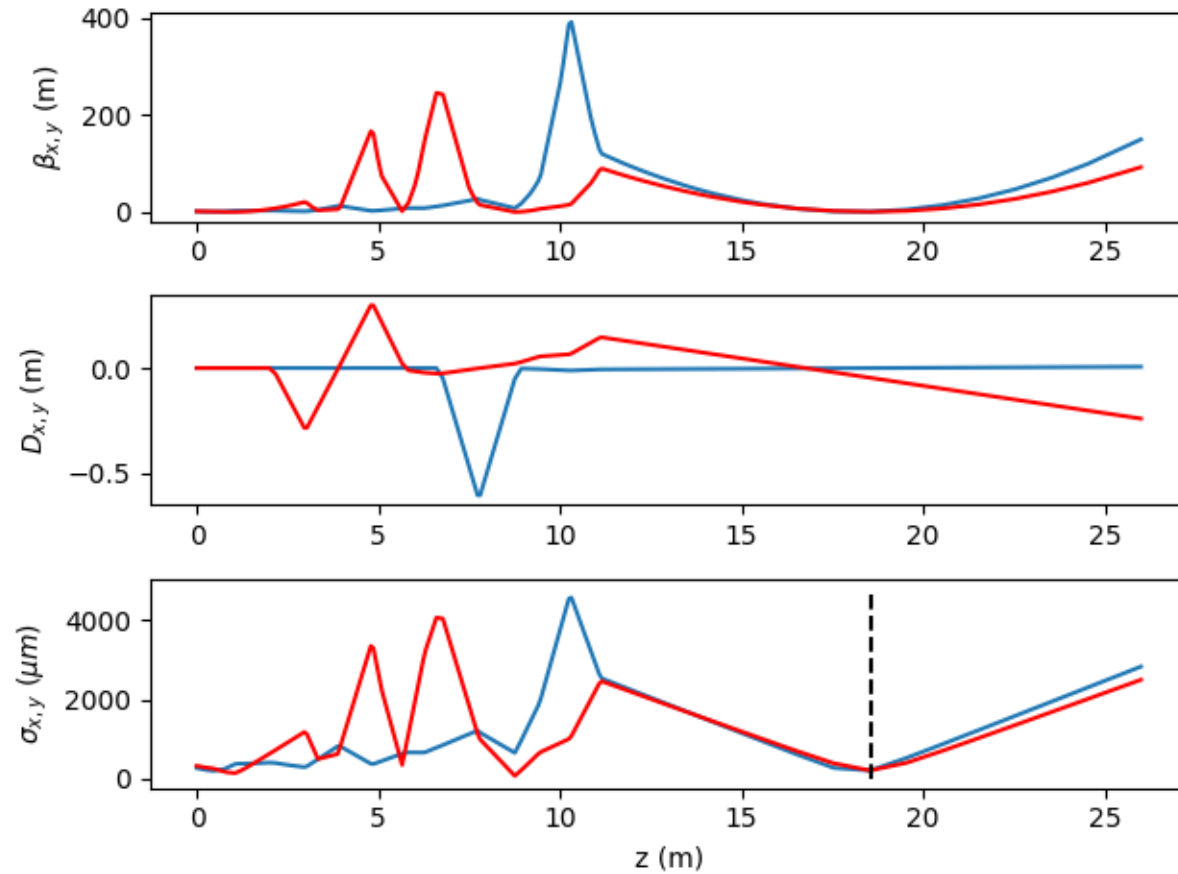
# New injection optics

Focal point = 2.5 m



# New injection optics

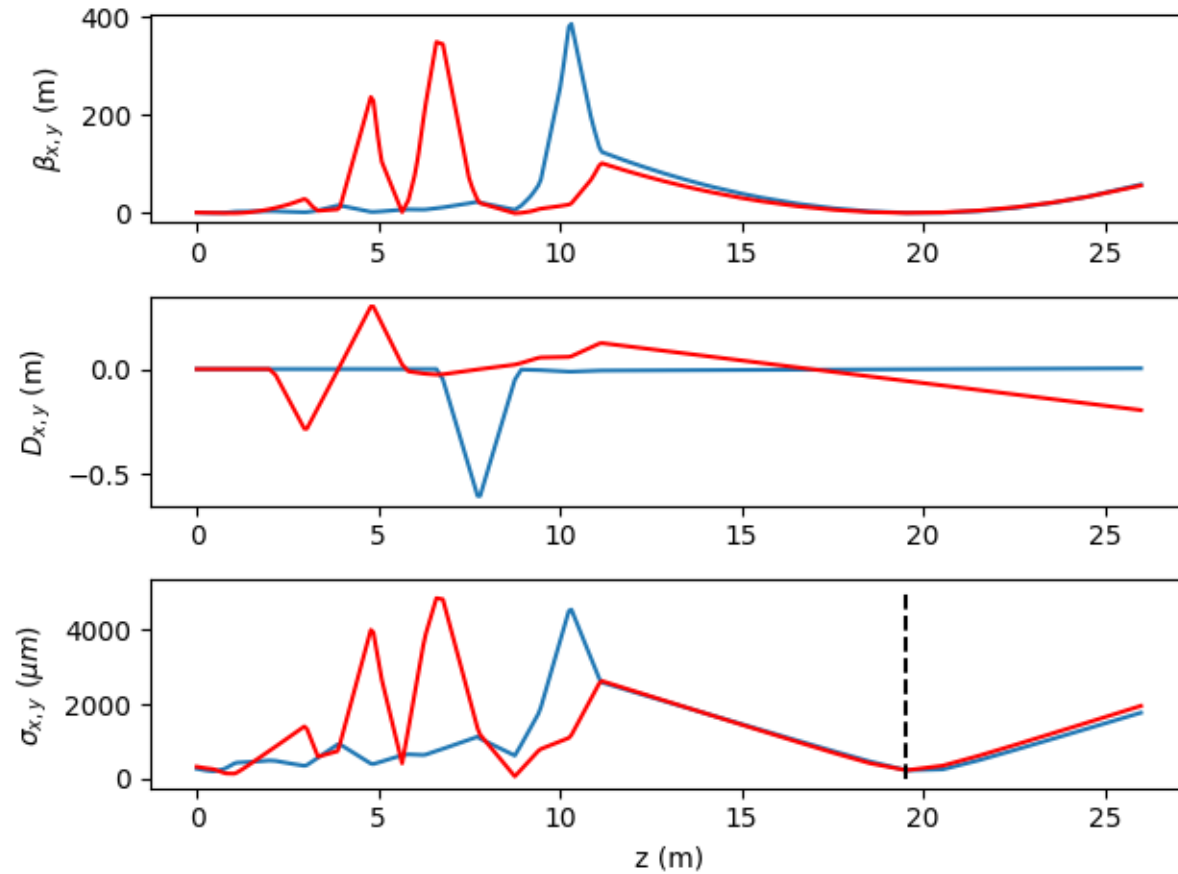
Focal point = 2.5 m





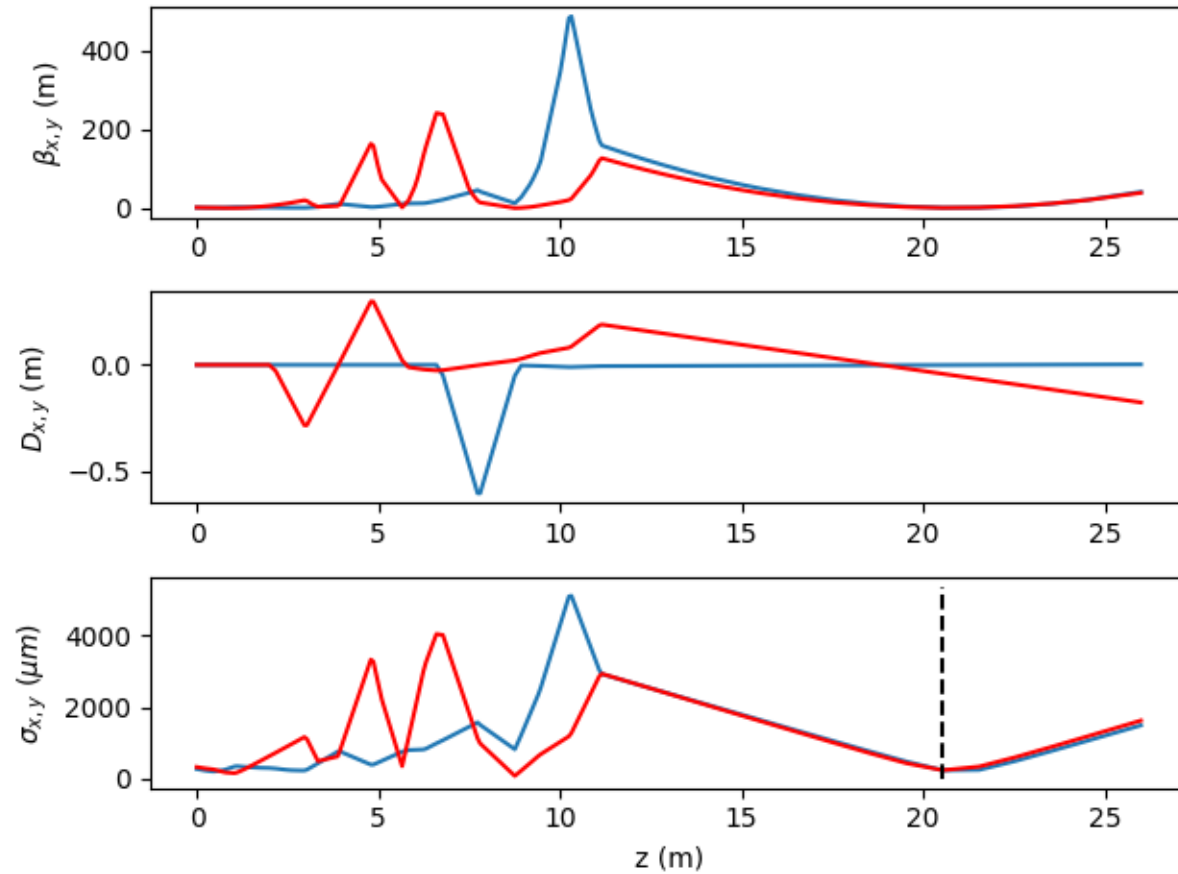
# New injection optics

Focal point = 4.5 m



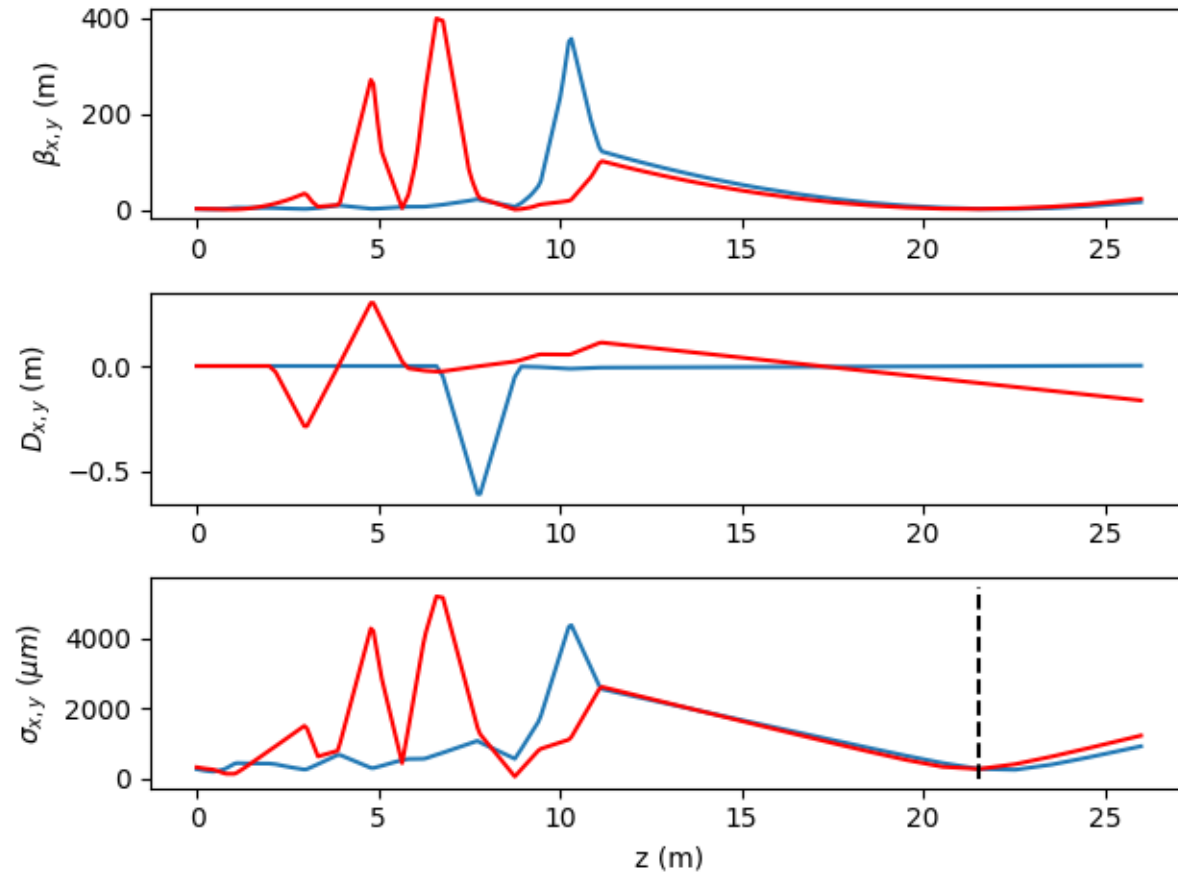
# New injection optics

Focal point = 5.5 m



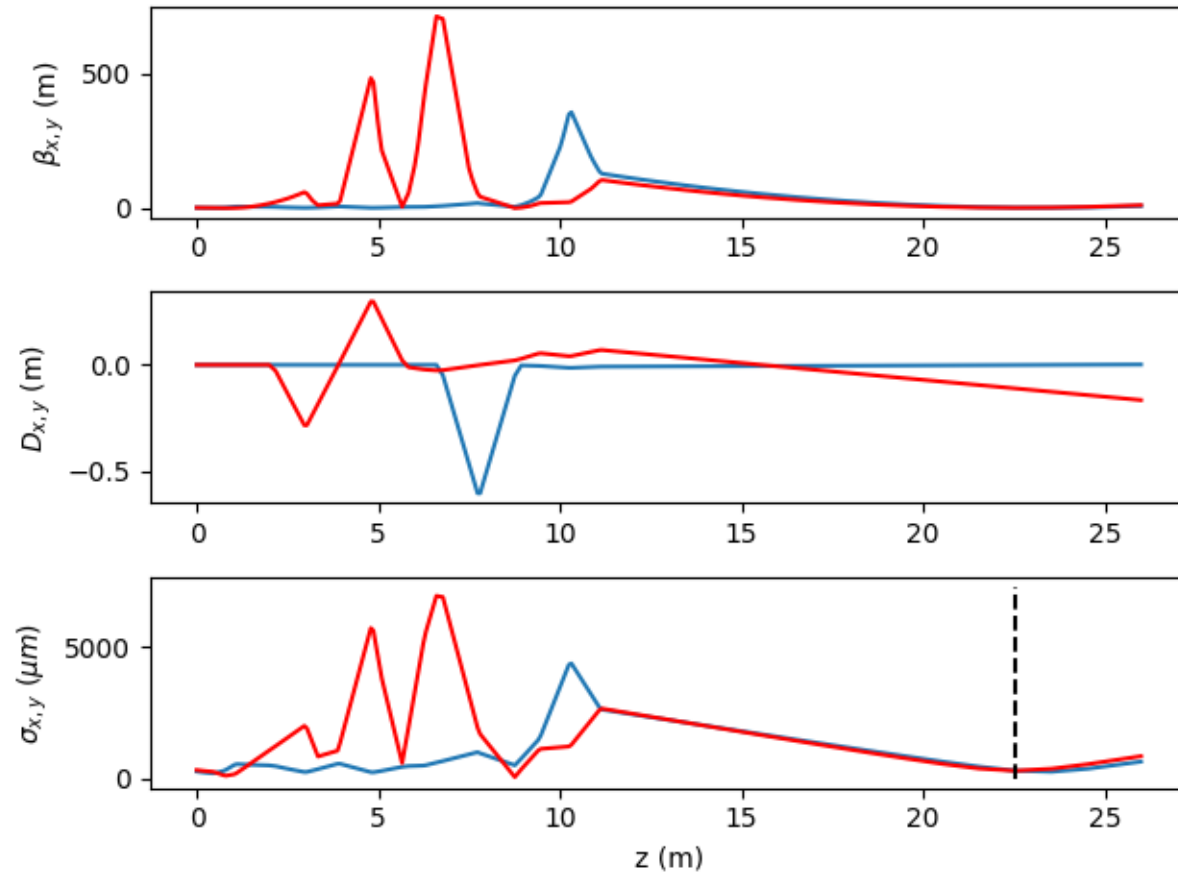
# New injection optics

Focal point = 6.5 m



# New injection optics

Focal point = 7.5 m



# New injection optics

Focal point = 8.5 m

