

LhARA Stage 1 Optimisation

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WP6 Meeting

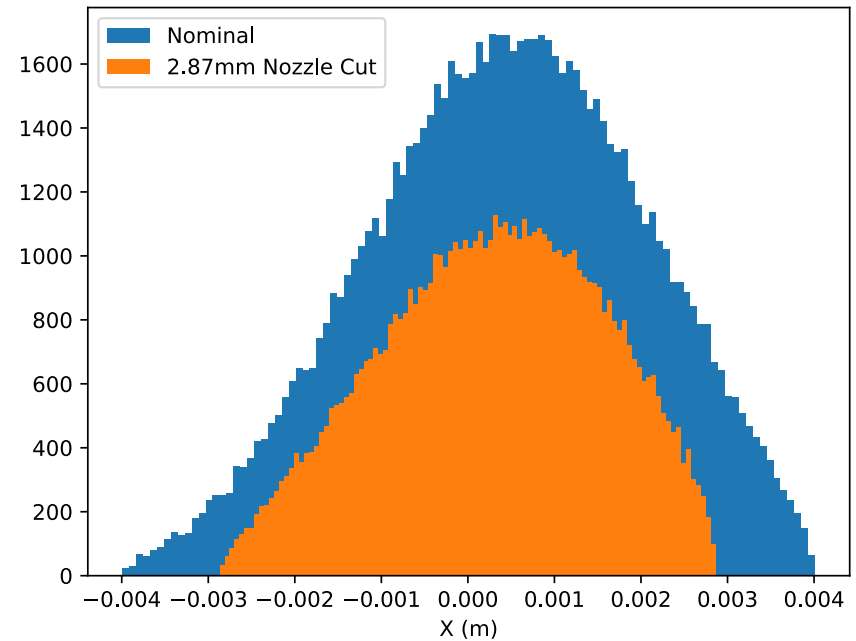
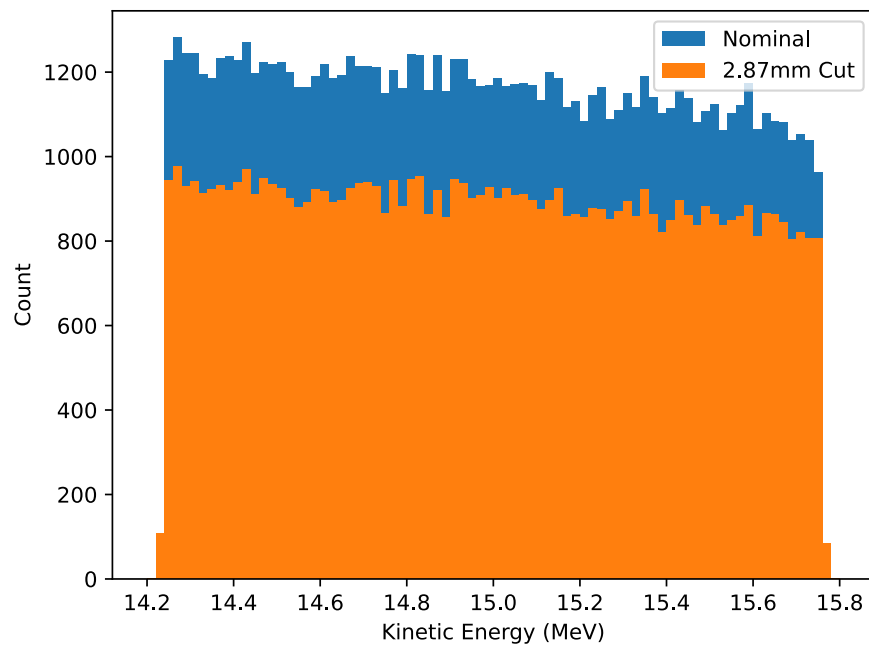
07th February 2023



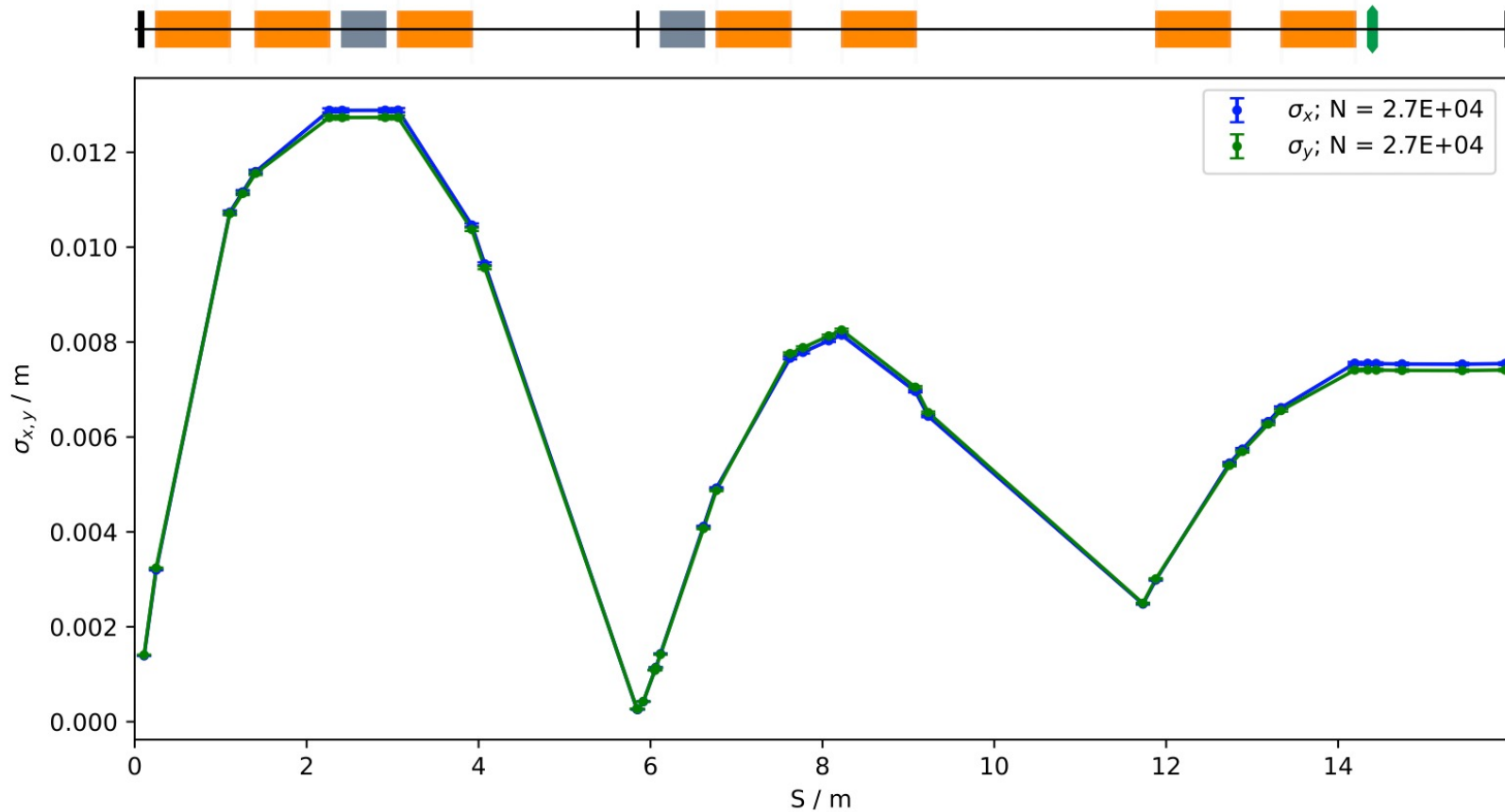
ROYAL
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- 15 MeV \pm 5%
- Applied manual radial cut of 2.87mm
- \sim 77% transmission efficiency



Optimisation – 3.0cm beam

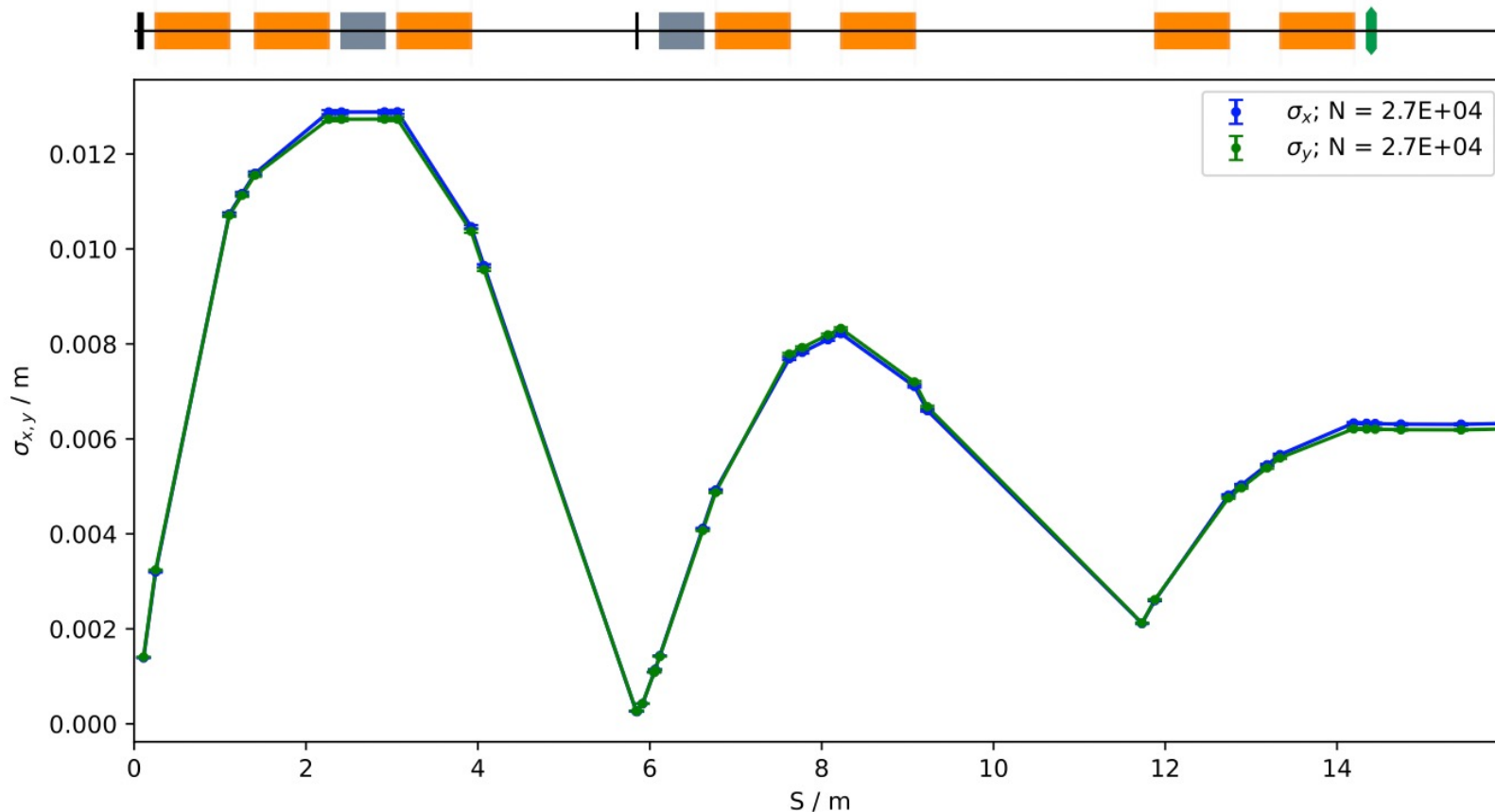


- Solenoid B fields:

- GL1: 1.400000 T
- GL2: 0.582830 T
- GL3: 0.817489 T

- GL4: 1.007153 T
- GL5: 0.903467 T
- GL6: 0.733509 T
- GL7: 0.642629 T

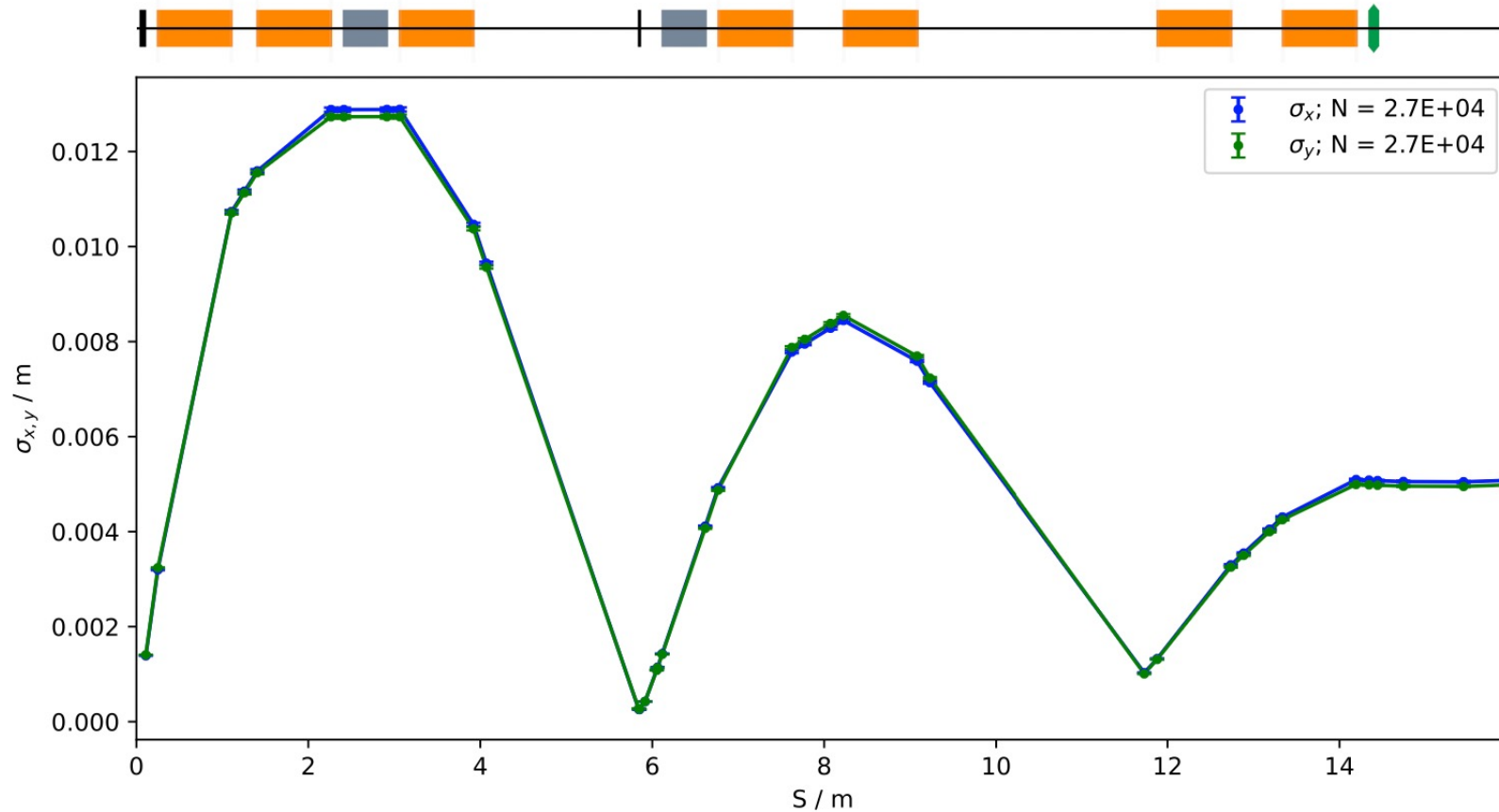
Optimisation – 2.5cm beam



- GL4: 0.998705 T
- GL5: 0.894656 T

- GL6: 0.877070 T
- GL7: 0.612375 T

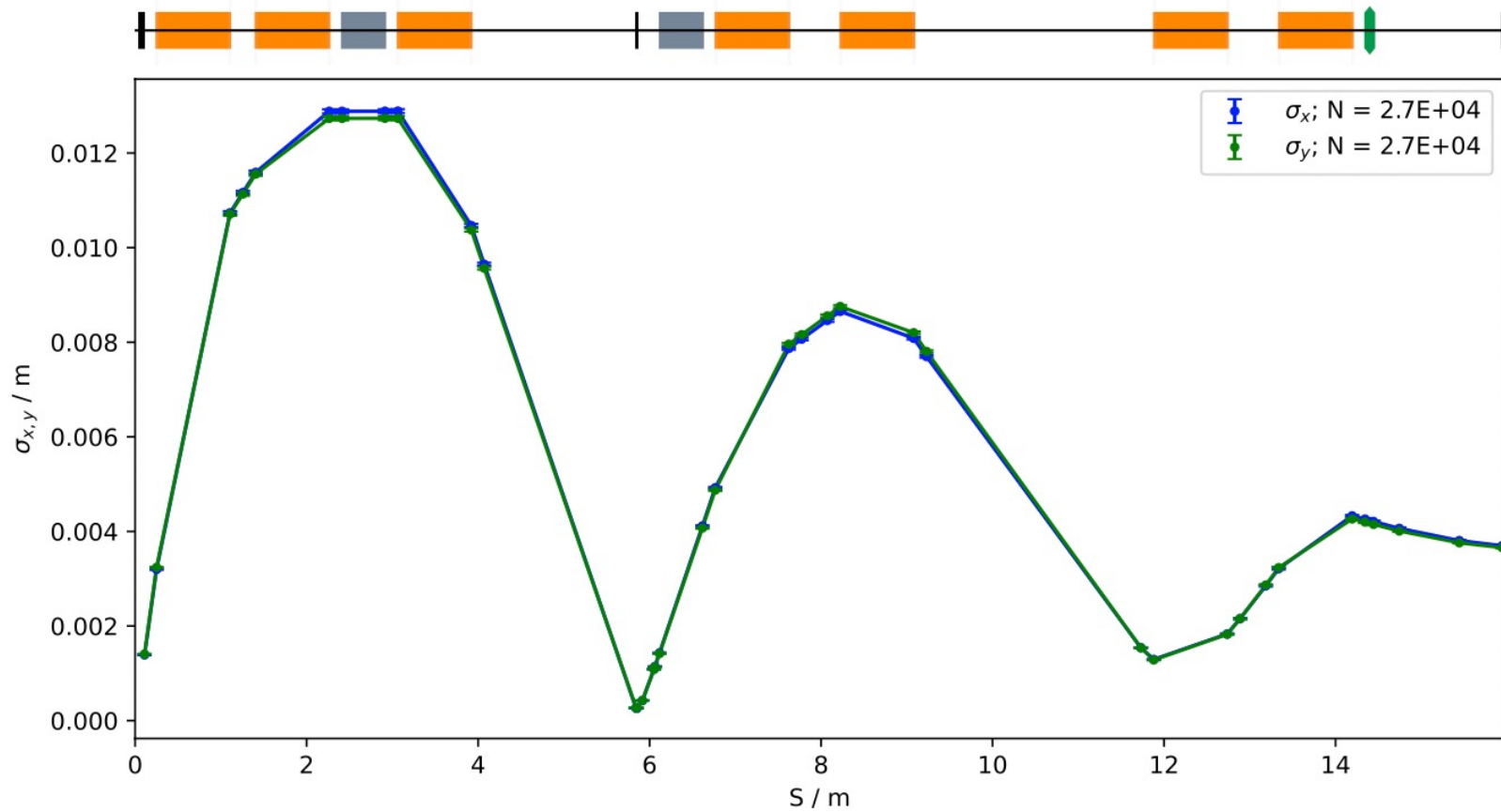
Optimisation – 2.0cm beam



- GL4:0.971571 T
- GL5:0.861107 T

- GL6:0.927205 T
- GL7:0.767267 T

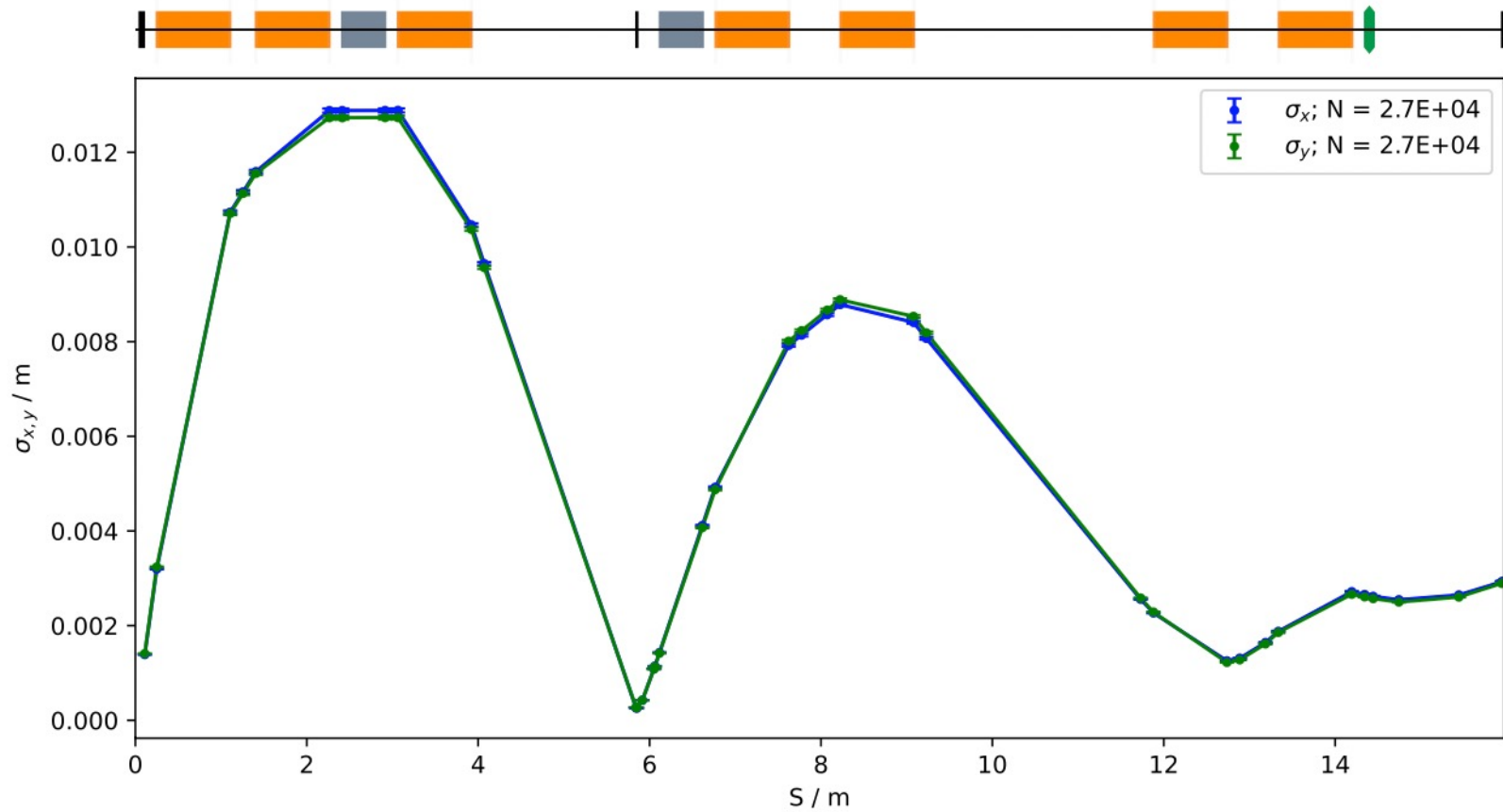
Optimisation – 1.5cm beam



- GL4: 0.946229 T
- GL5: 0.819185 T

- GL6: 0.225566 T
- GL7: 1.075499 T

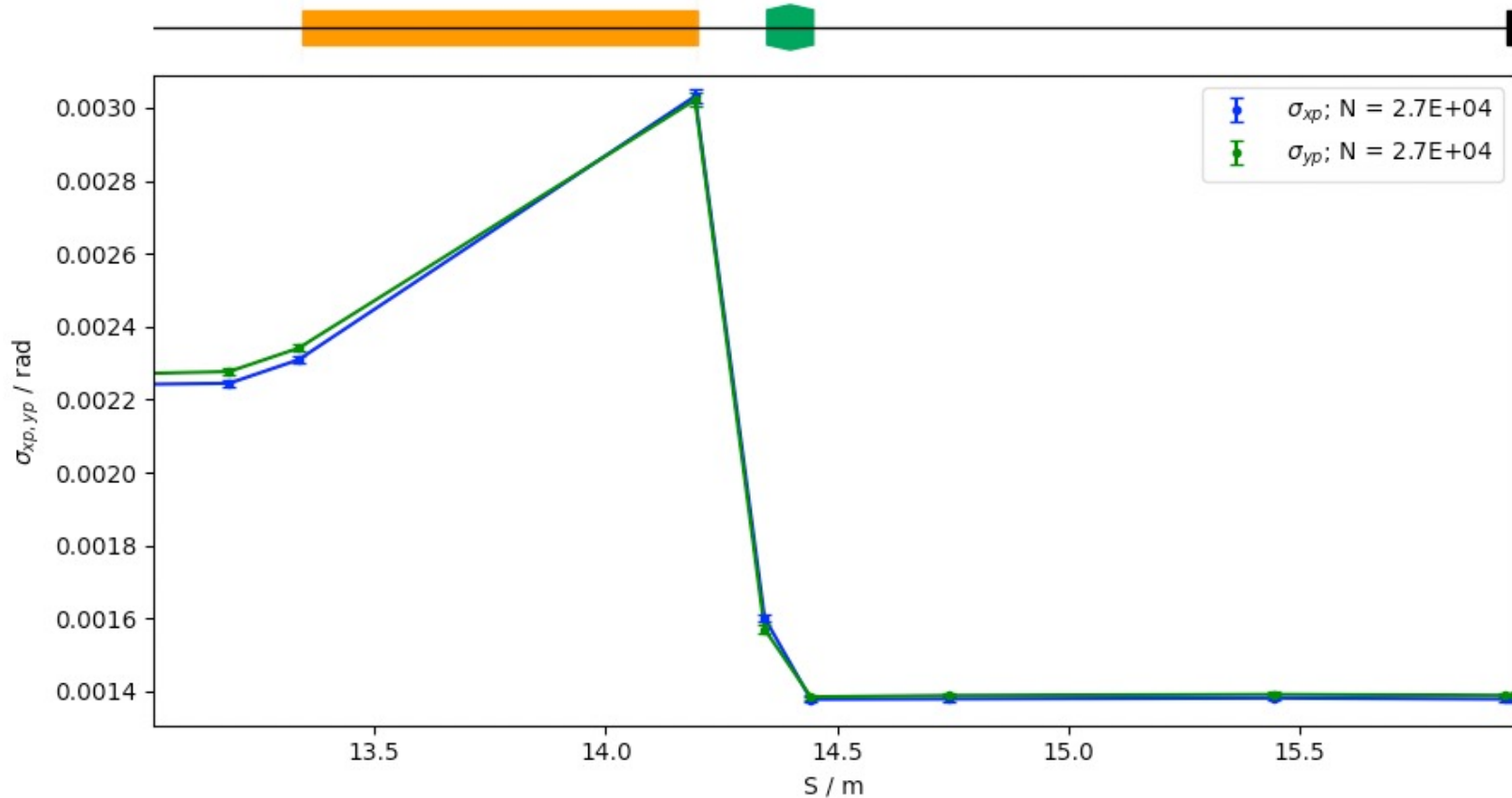
Optimisation – 1.0cm beam



- GL4: 0.9300035 T
- GL5: 0.7896617 T

- GL6: 0.105197 T
- GL7: 1.279942 T

Optimisation – 1.0cm beam



- Near zero change in transverse momentum after GL7
- GPT magnets not hard-edged
- Minimal impact from space charge

- Done:
 - Found optimised solutions for stage 1 (SCAPA beam) with space charge
 - Large beam sizes
- Ongoing:
 - Find solutions for smaller beam sizes
 - Update models of alternative baseline design (v5.5)
- Todo:
 - Model beams with full energy spread
 - Quads only model (v6.0)
 - Develop OPAL model of FFA – need JP input.