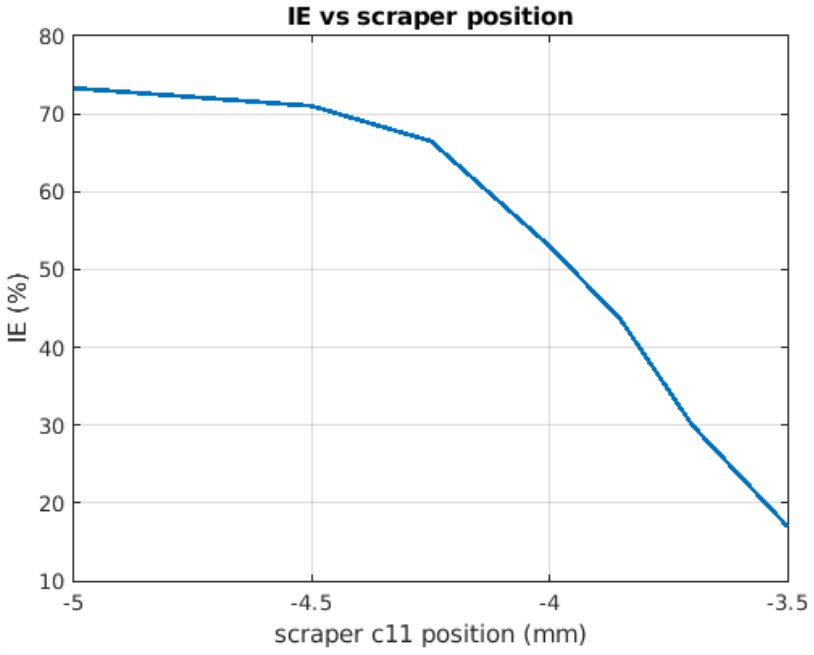
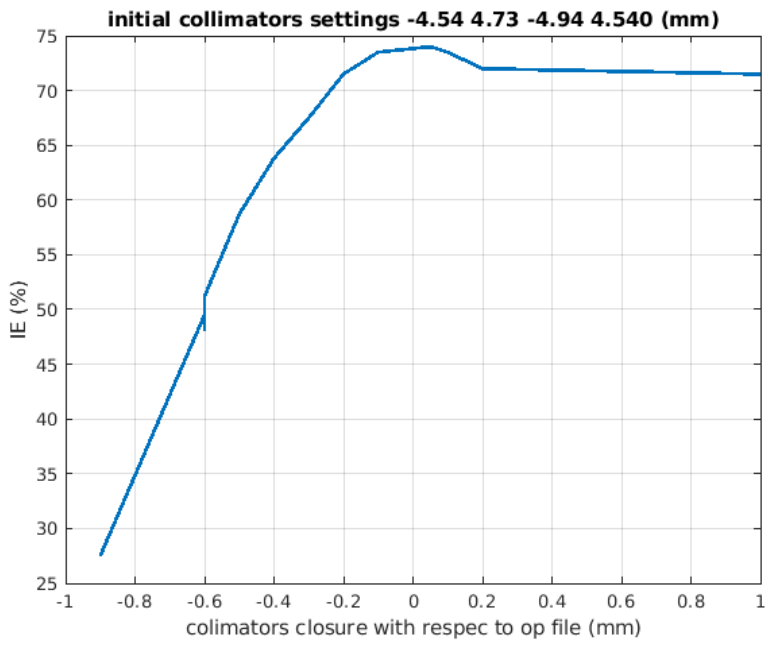
Shared oscillation injection/IE vs scraper/cycling

BD meeting 06/06/2023

IE vs scraper and collimator

In the view of the SI SLS tests we should expect 50% injeff with the absorber at 4mm. Any 0.5mm additional restriction will make the machine difficult to operate.





test of shared injection with unclosed bump to optimise injected current

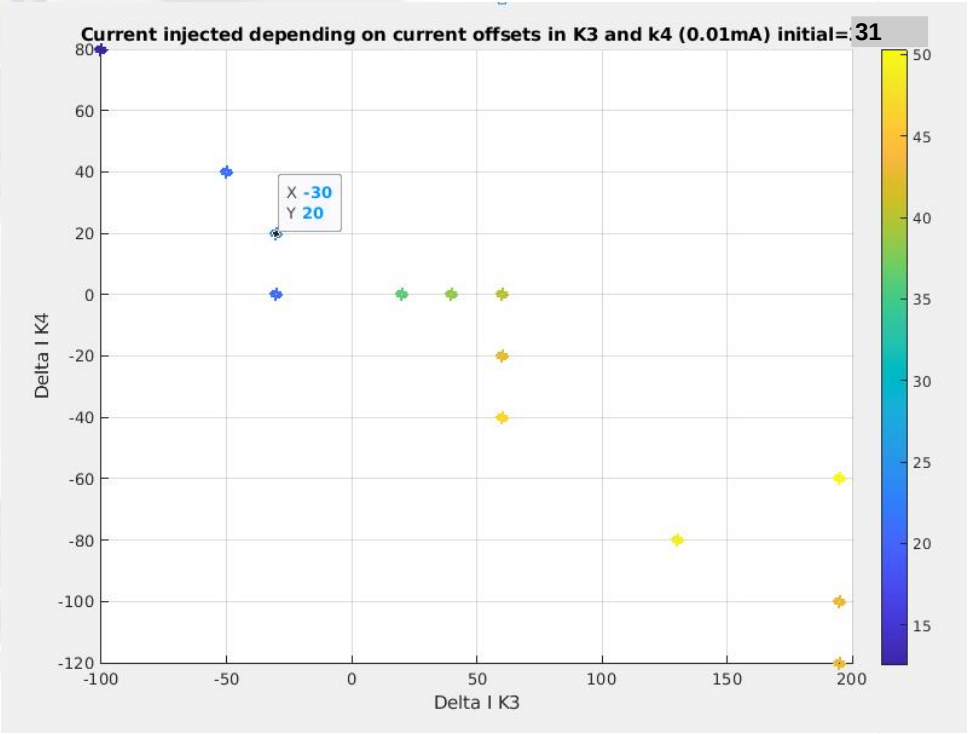
- No TBT available, we where completely blind on injected trajectory.

- With slow kickers the experiment cannot be done with stored beam.

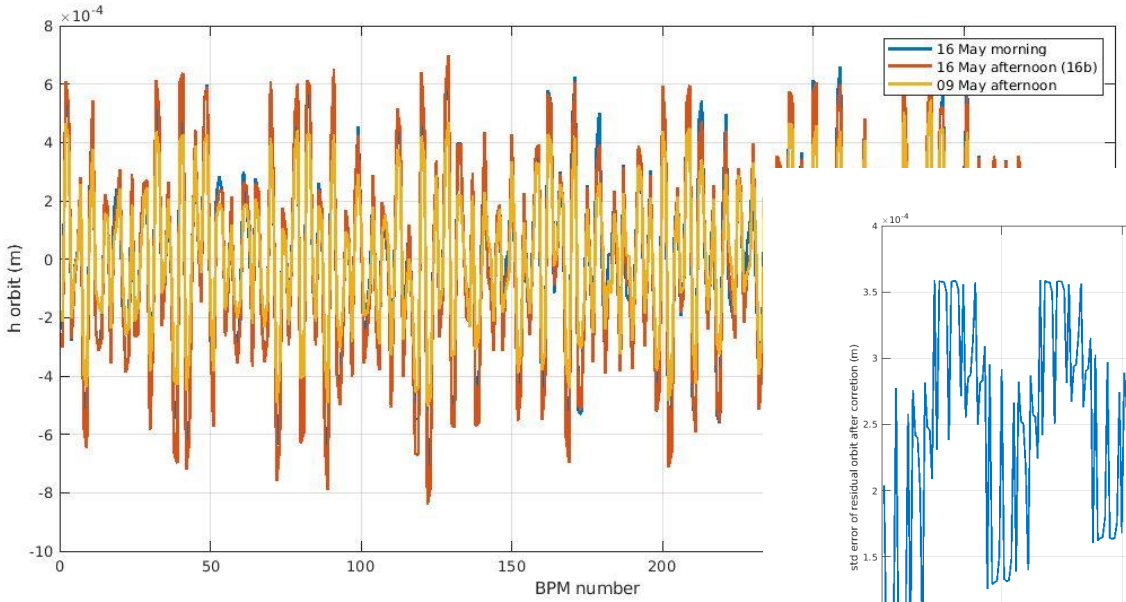
- The observable is the current intesity injected in 1 shot considering the booster current is constant.

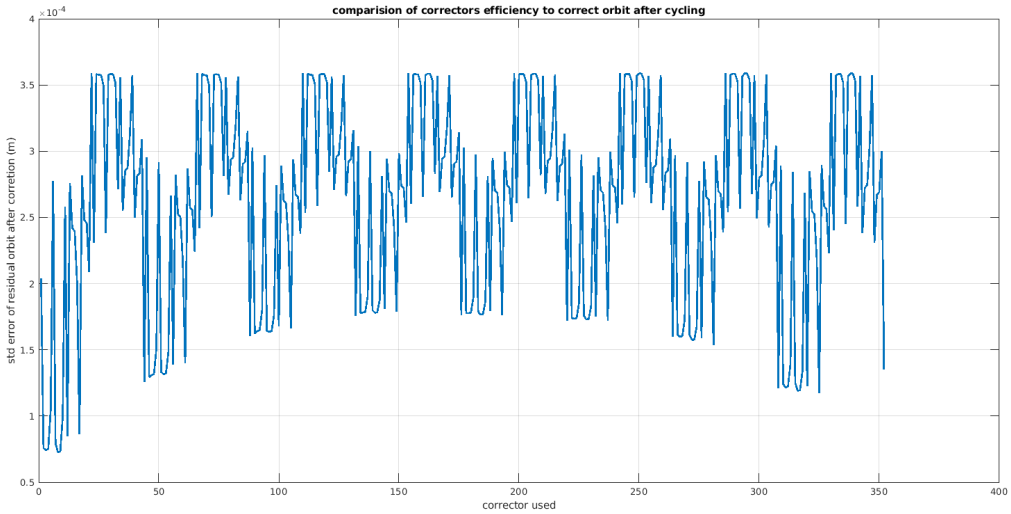
- Simulations still to be done.

- Collimators closed at 4mm.



Cycling





After each cycling, orbit is bad, but very reproducable.

Single corrector of first cell can correct the orbit down to 75µm rms. (all horizontal)

Maybe the operation file is corrupted or not compatible with changes mad on the PS.

Shared oscillations injection

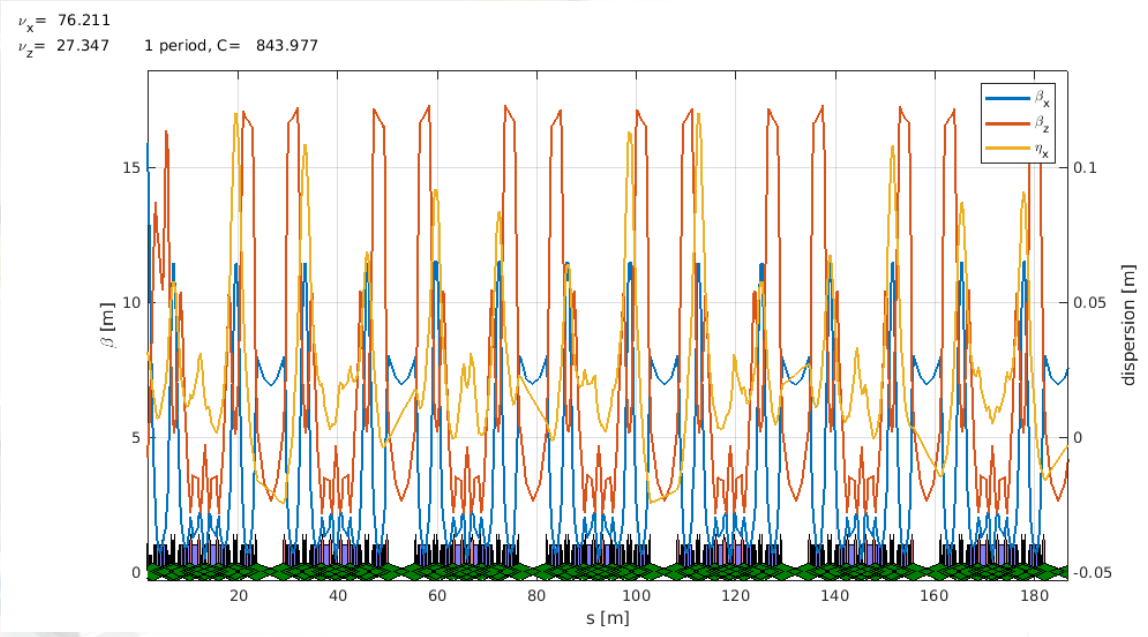
Simulation of IE with a single kicker installed in the first SF following injection point.

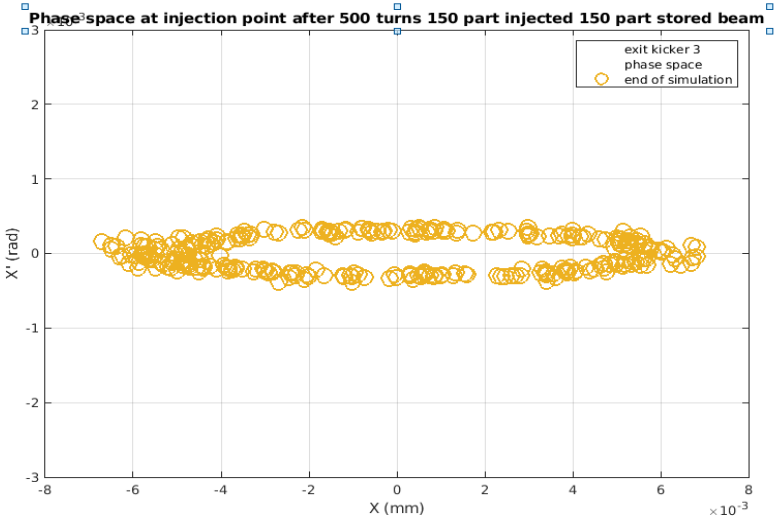
Kicker deflection=0.45mrad.

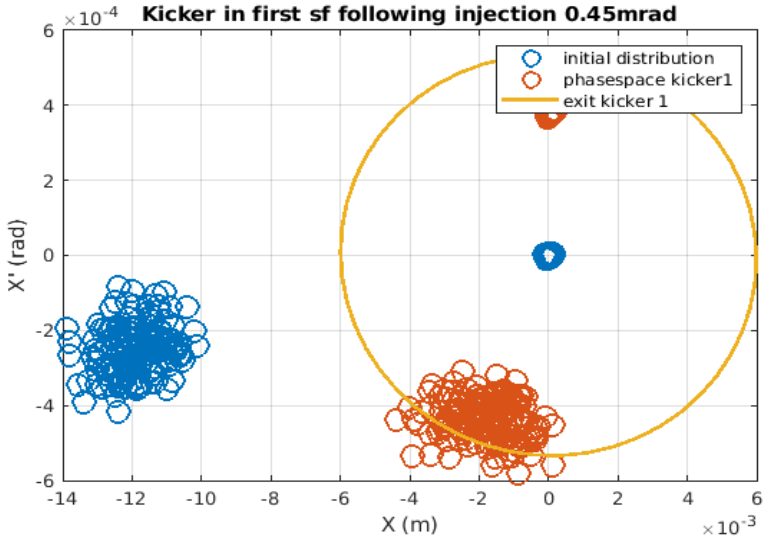
No RF and no radiation.

150 particles in both injected and stored beam. Tracking for 500 turns.

Machine with errors (not quantified).







- 100% injeff reached. Injected beam is injected at ΔX=12mm compatible with a septum blade at 7mm from the injected beam.
- The kick can be shared between two kickers, the second one being in any SF. The strength of each kicker is then 0.225mrad
- Inserting a fast strip line in the vacuum chamber of the sextupoles will not be easy.

shared oscillations

Seems very promising if we find a solution to insert a Sl kicker in the sf vacuum chamber.

The kicker strength required is relatively small. It can be obtained by a 0.5m Kicker with 10 mm spacing between the blades, and a 30KV pulser.

The advantage of such scheme is that you can combine it with any other scheme to enhance performance.

Can we gain space between SF and the neerby QF??