

Circumference Lengthening

03/11/15 measurements

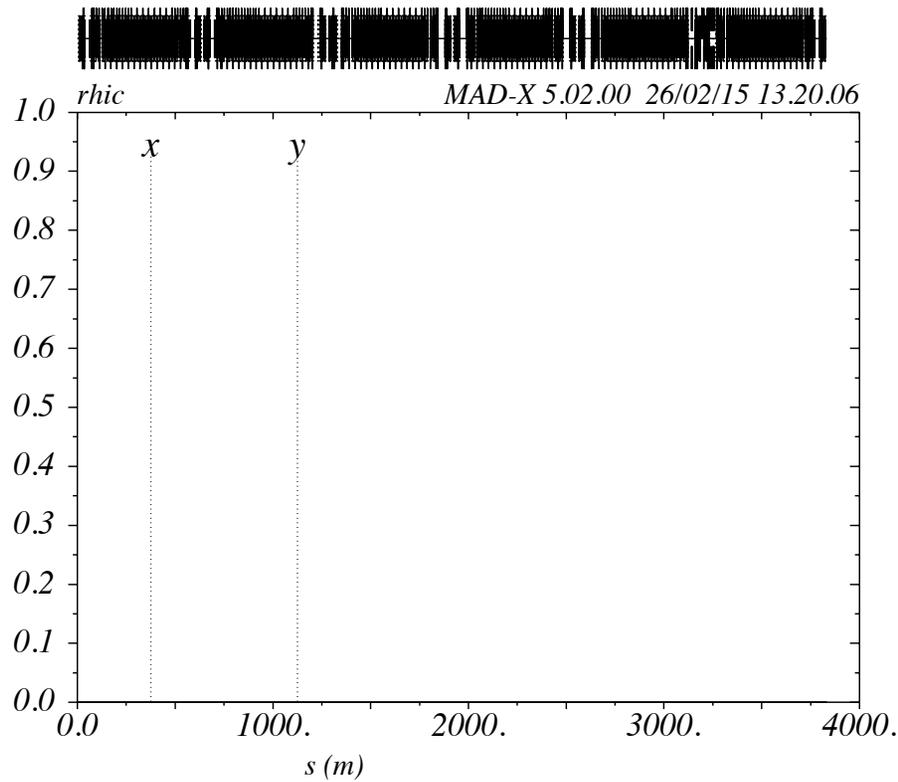
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A. Marusic, G. Robert-Demolaize,
D. Trbojevic

03/11/15 study

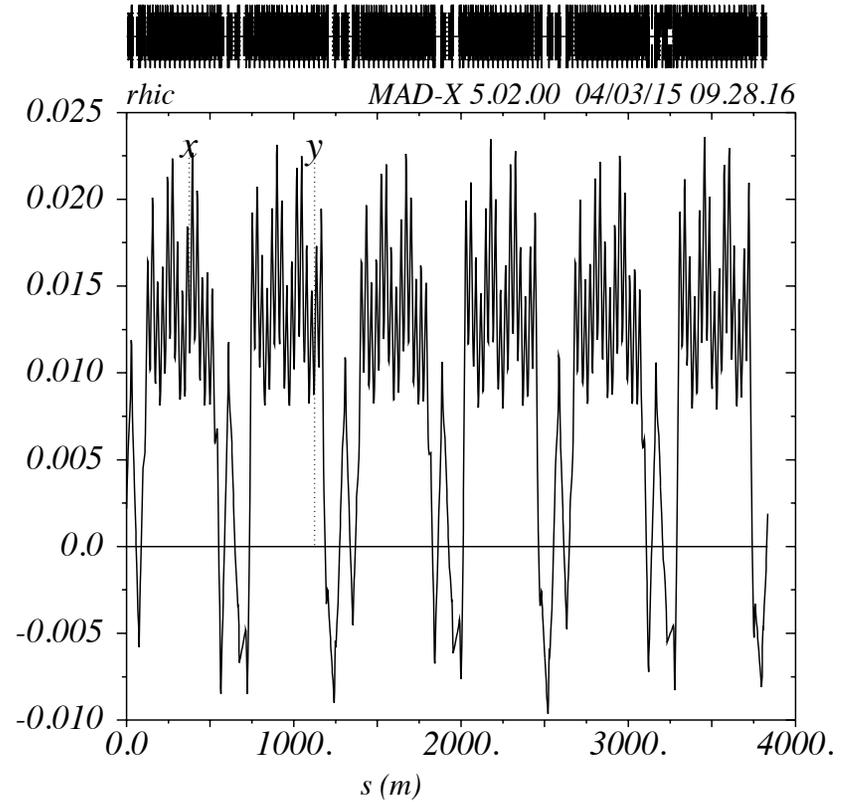
- Started ~20min later, but then got additional half hour. ~2h for whole study.
- Measurements were done at the injection
- Dedicated ramp was prepared by Guillaume and Al to change all quadrupole strength proportionally to momentum change.
- The goal was to verify the ramp operation.
- Used momentum change dp/p up to 0.005 (radial shift ~ 6mm in arc)

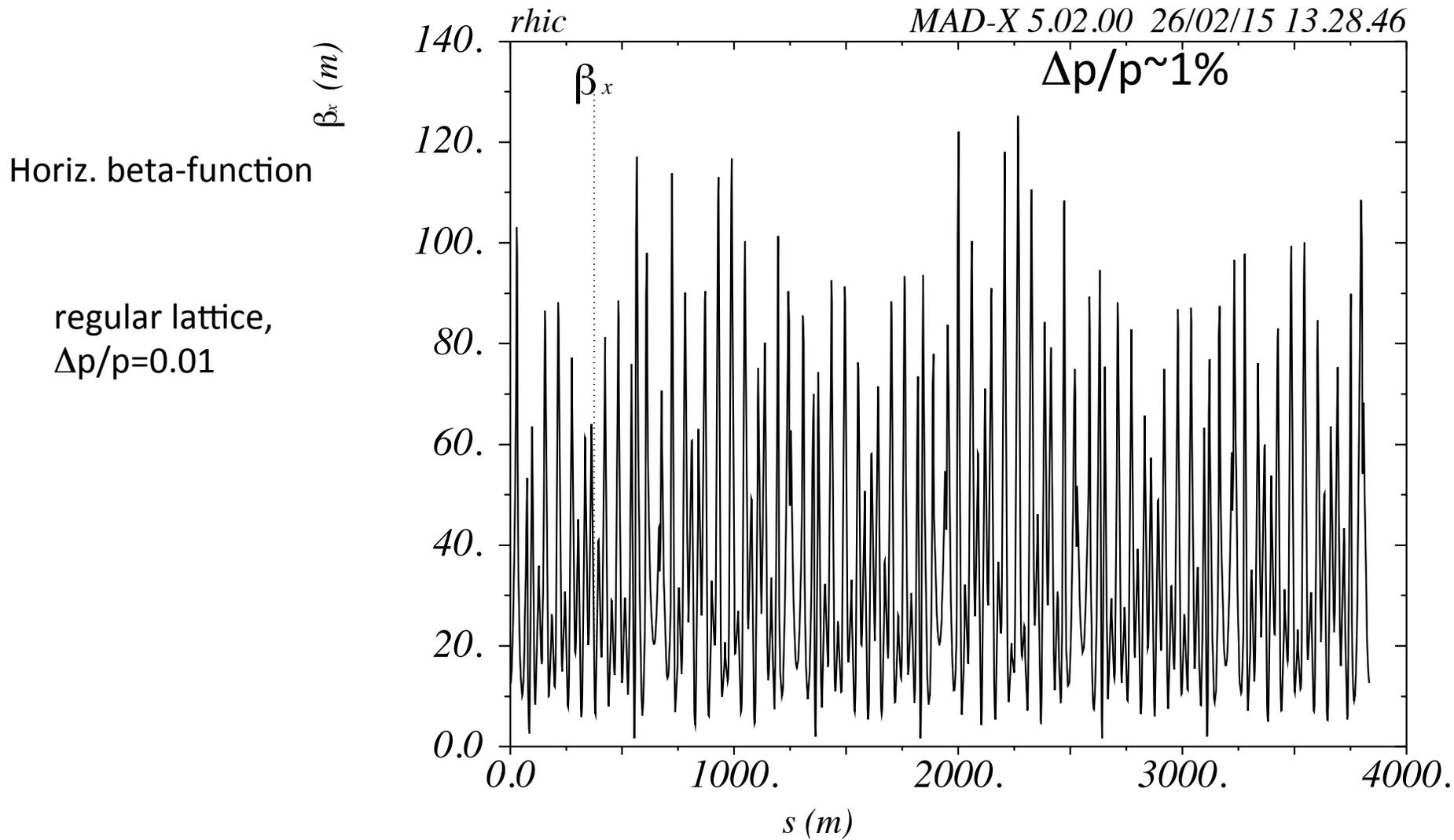
Radial orbit

regular lattice, $\Delta p/p=0$



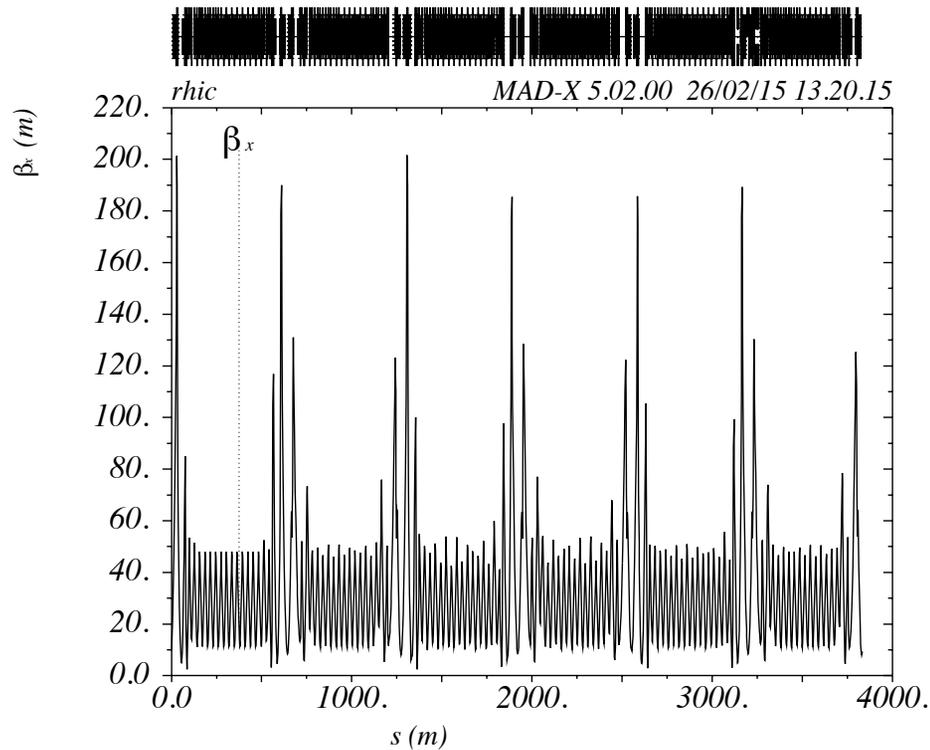
optimized lattice, $\Delta p/p=0.01$



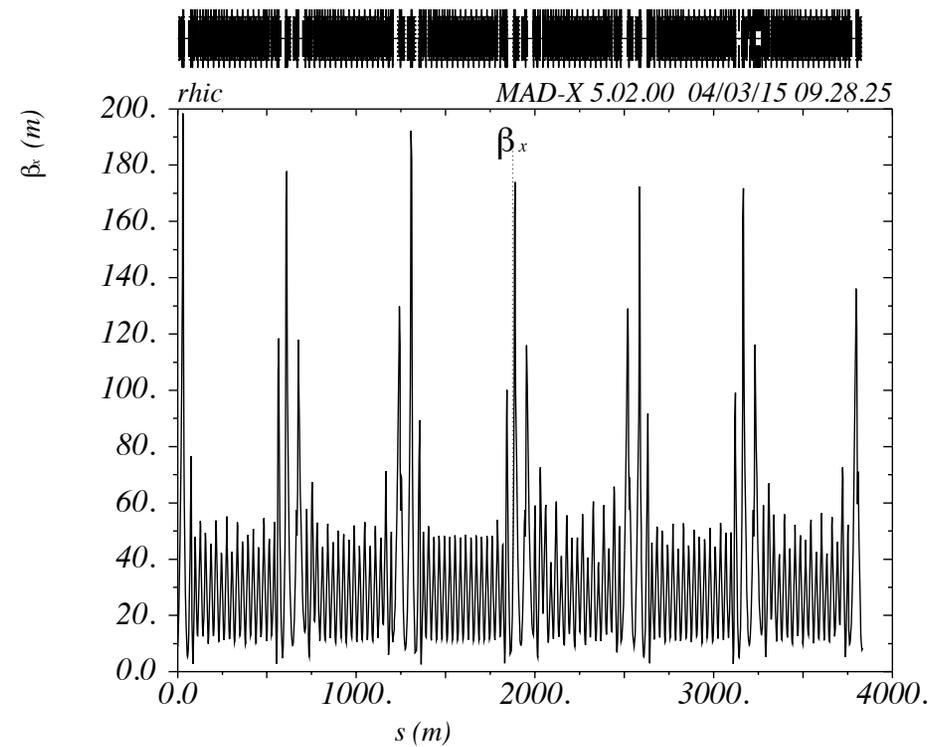


Horizontal beta function

regular lattice, $\Delta p/p=0$

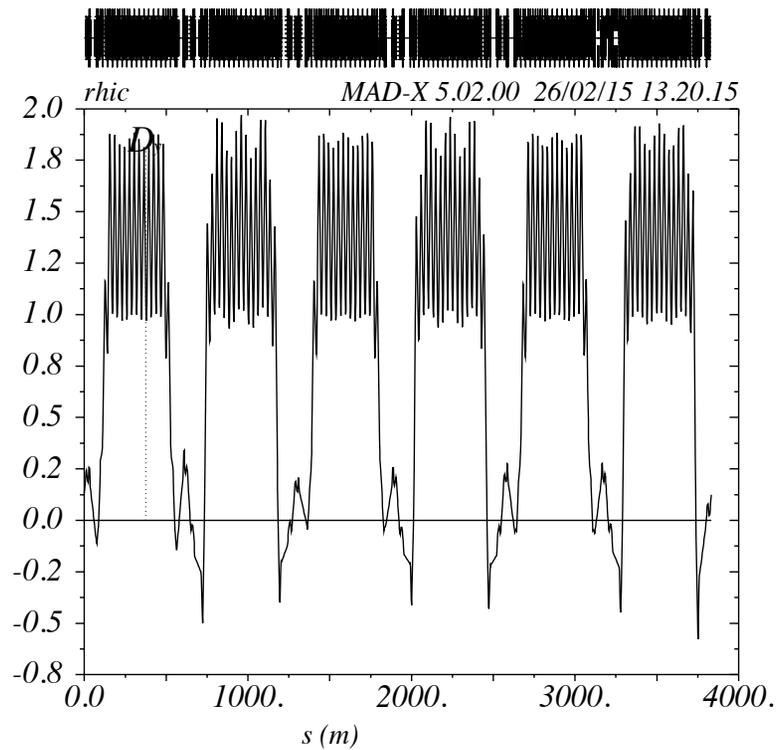


optimized lattice, $\Delta p/p=0.01$

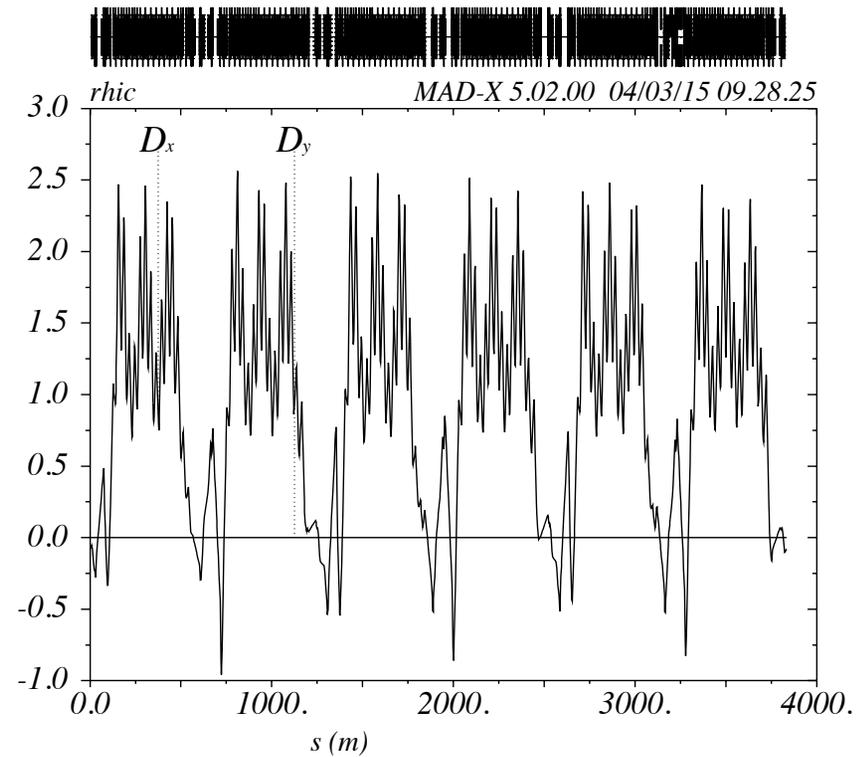


Dispersion function

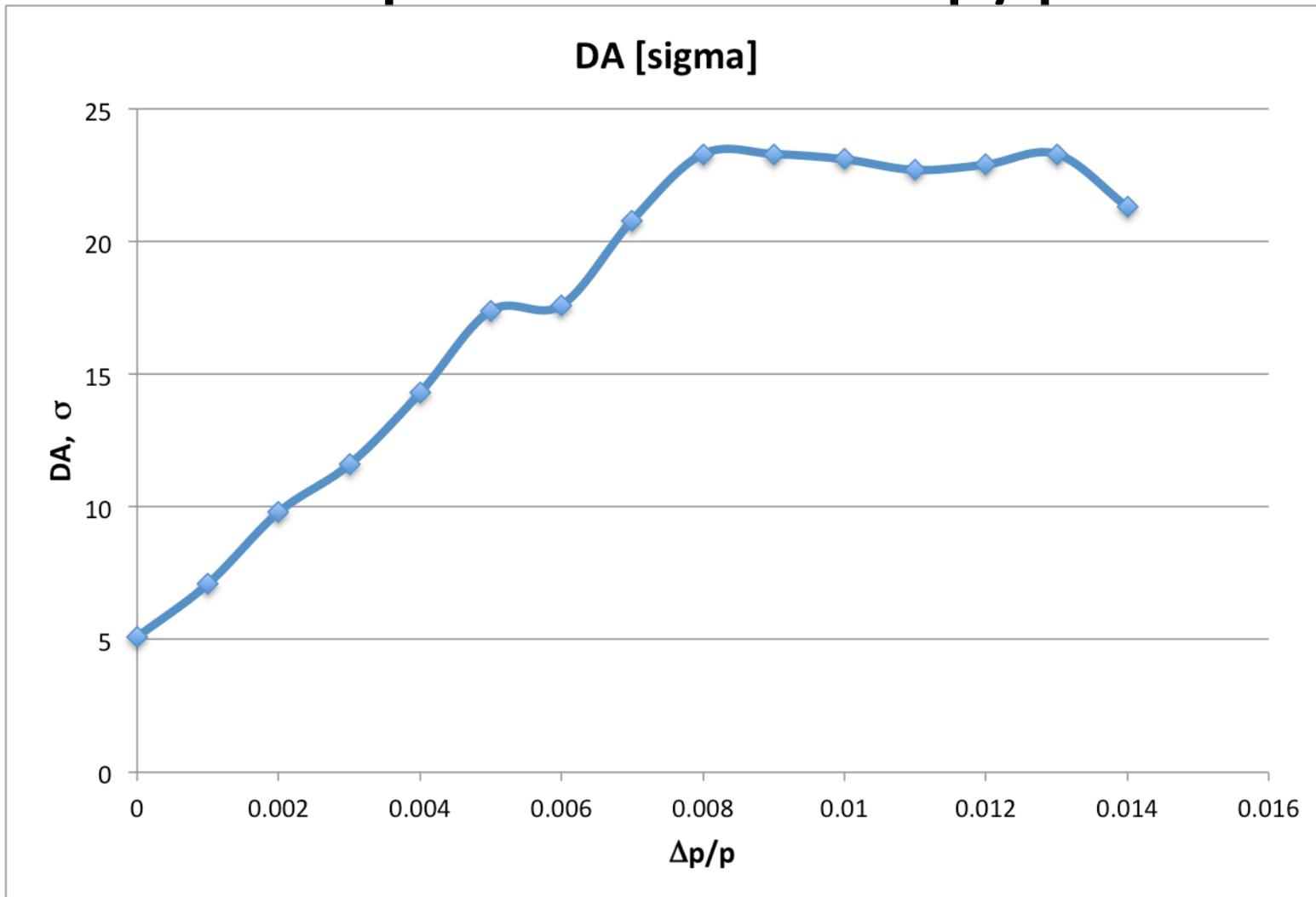
regular lattice, $\Delta p/p=0$



optimized lattice, $\Delta p/p=0.01$



DA evaluation for the lattice optimized for $dp/p=0.01$



Y. Luo

Dedicated Ramp

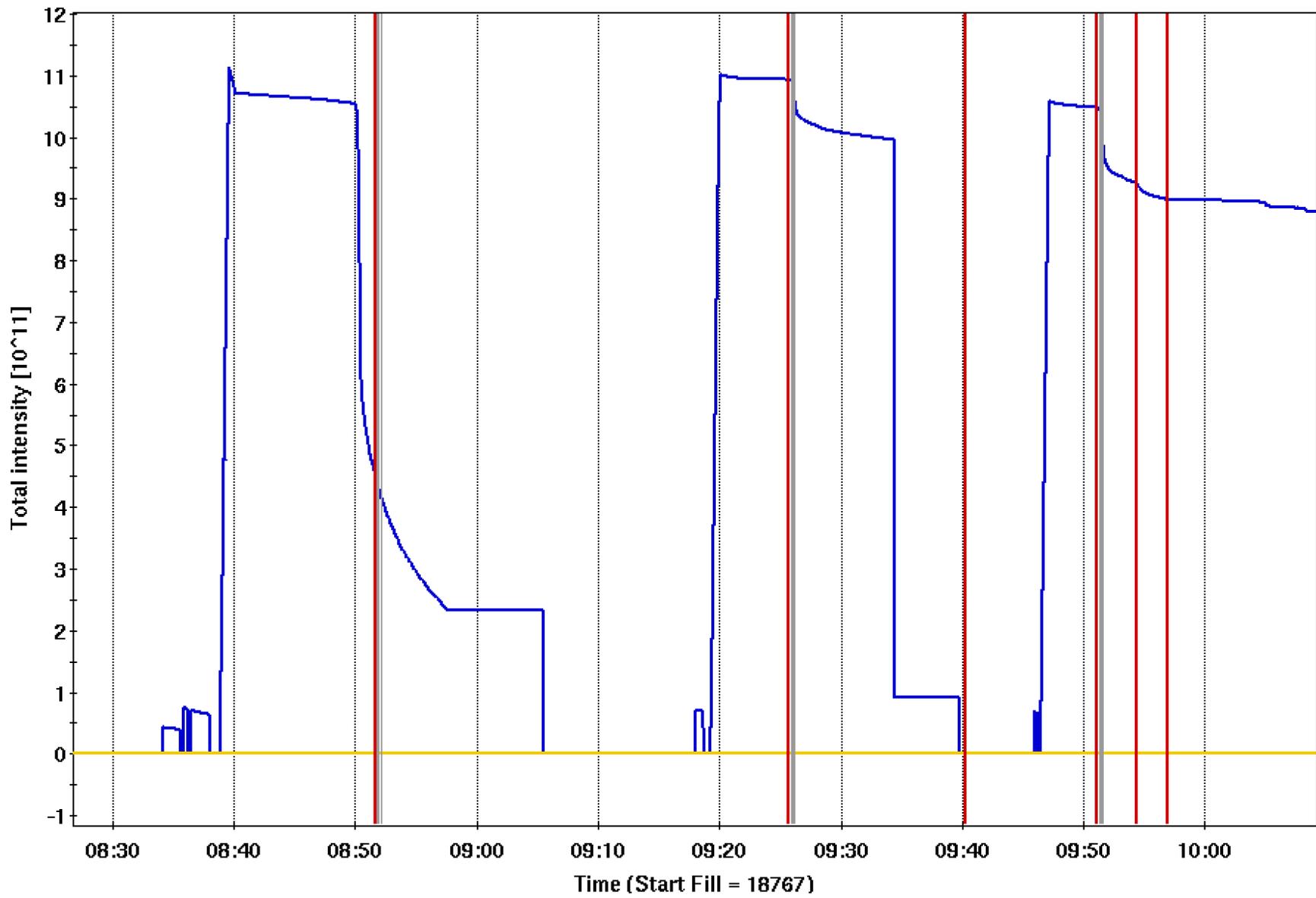
The screenshot shows the RampEditor software interface. The title bar reads "RampEditor (on cscompile01.pbn.bnl.gov)". The menu bar includes "Ramp", "Edit", "Buffer", "Optics", "Stepstone", "Compare", "Diagnostics", and "Help". The status bar shows "Editing: pp15-APEXradius0", "Live Stone: pp15-APEXradius0::store", "Ramp State: LastStone", and buttons for "Save" and "Activate / Make Live". The "Stepstone Editor" tab is active, showing a table with columns for Time, Stepstone, Gamma, TuneX, TuneY, ChromX, and ChromY. The table has four rows, with the first row highlighted in blue and the others in yellow. A "Tune Nudge" control is visible at the bottom of the table area, set to 0.0005. A log window at the bottom of the interface displays the following messages:

```
wfgMan:messageM = Auxramp to last initiated (53 PS moved) (Mar 11 10:01:41)
Ramp activate successful. (Mar 11 10:01:43)
Ramp file activated - pp15-APEXradius0_1426082499 (Mar 11 10:01:43)
```

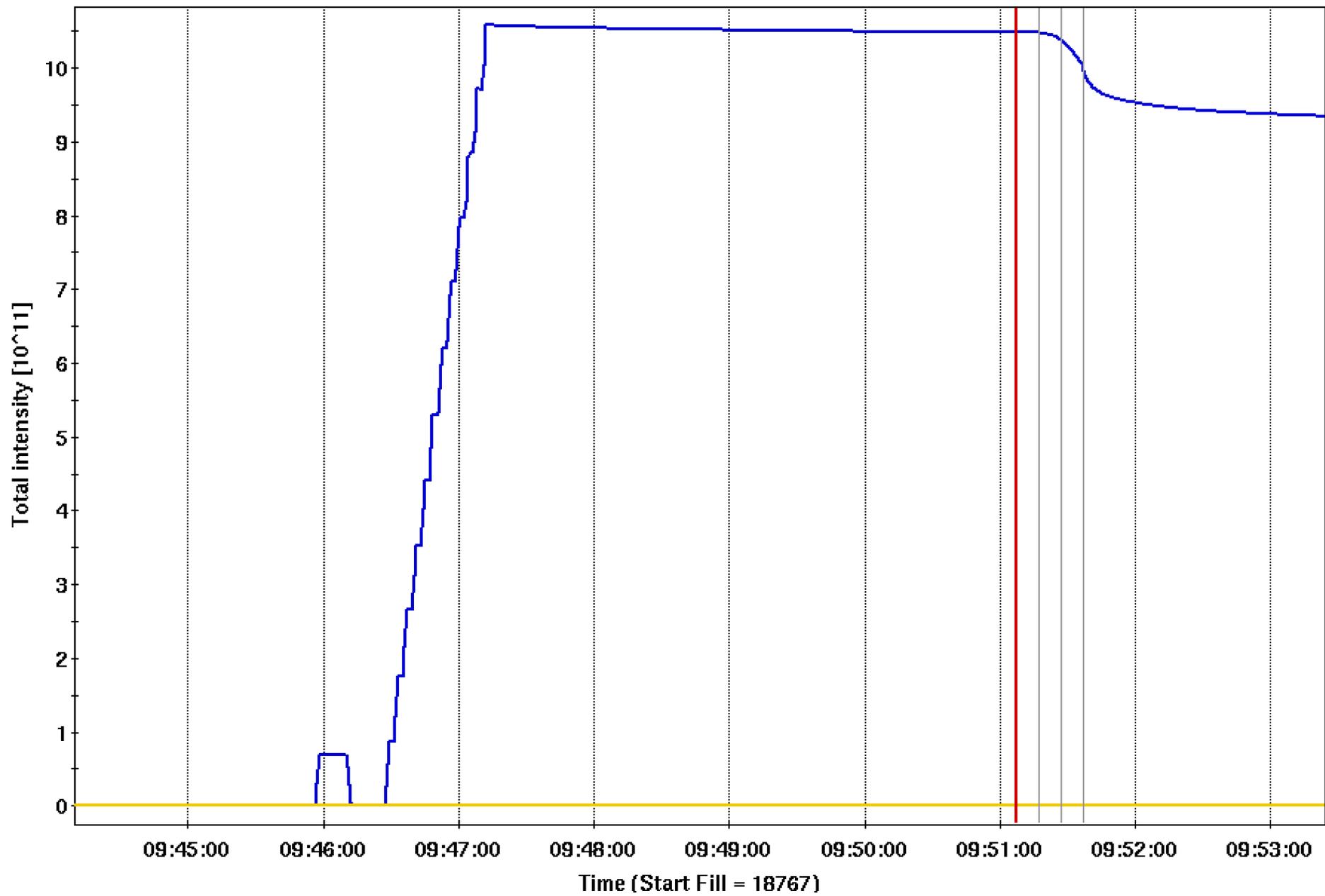
| | Time | Stepstone | Gamma | TuneX | TuneY | ChromX | ChromY | TuneX | TuneY | ChromX | ChromY |
|---|------|-----------|--------|---------|---------|--------|--------|---------|---------|--------|--------|
| 1 | 0.0 | injection | 25.379 | 29.6222 | 30.6058 | 2.6 | 0.5 | 29.6222 | 30.6058 | 2.6 | 0.5 |
| 2 | 10.0 | t10 | 25.379 | 29.7027 | 30.6857 | -0.4 | -0.1 | 29.6222 | 30.6058 | 2.6 | 0.5 |
| 3 | 20.0 | t20 | 25.379 | 29.8094 | 30.7883 | -6.6 | -0.9 | 29.6222 | 30.6058 | 2.6 | 0.5 |
| 4 | 30.0 | store | 25.379 | 29.9140 | 30.8723 | -38.5 | -2.7 | 29.6222 | 30.6058 | 2.6 | 0.5 |

Ramp adjustments

- Octupole were switched off.
- Sextupole settings were used on the base of MAD model prediction (but without dipole magnet sextupole contribution)
- RF frequency and magnet ramp was completely synchronized. Duration 30 sec.
- Found problems: quad adjustment limits during tune feedback and automatic disengagement of the tune feedback at the store.
- Measured and corrected chromaticity at the store stone.



— bluDCCTtotal — yelDCCTtotal — ev-accramp — ev-stone



bluDCCTtotal yelDCCTtotal ev-accramp ev-stone

Further plan

- Having the ramp machinery tested at last studies, go to full ramp with momentum change up to 1%. (Prepare also the ramp for -1% momentum change)
- Include dipole magnet contribution to sextupole field to calculate more accurate QF, QD, SF, SD settings for the ramp.