Tight collimator settings MD

R. Assmann, R. Bruce, F. Burkart, M. Cauchi, D. Deboy, L. Lari, S. Redaelli, A. Rossi, B. Salvachua, G. Valentino, D. Wollmann, S. Fartoukh et al.

Motivation and goal of MD

- Benefits with tight settings (IR7 @ 4-6-8 sigma, TCT @ 9.3):
  - Smaller β* possible
  - Better efficiency => Higher stored intensities
  - Tight settings (in mm) needed for nominal 7 TeV operation
- Tight settings tested successfully in previous MDs
- Goal of MD:
  - Investigate the long-term stability of the cleaning performance with tight settings **DONE**
  - Qualify cleaning with ATS-squeeze β*=40cm (see S. Fartoukh et al) to establish reference for pile-up studies **NOT DONE**

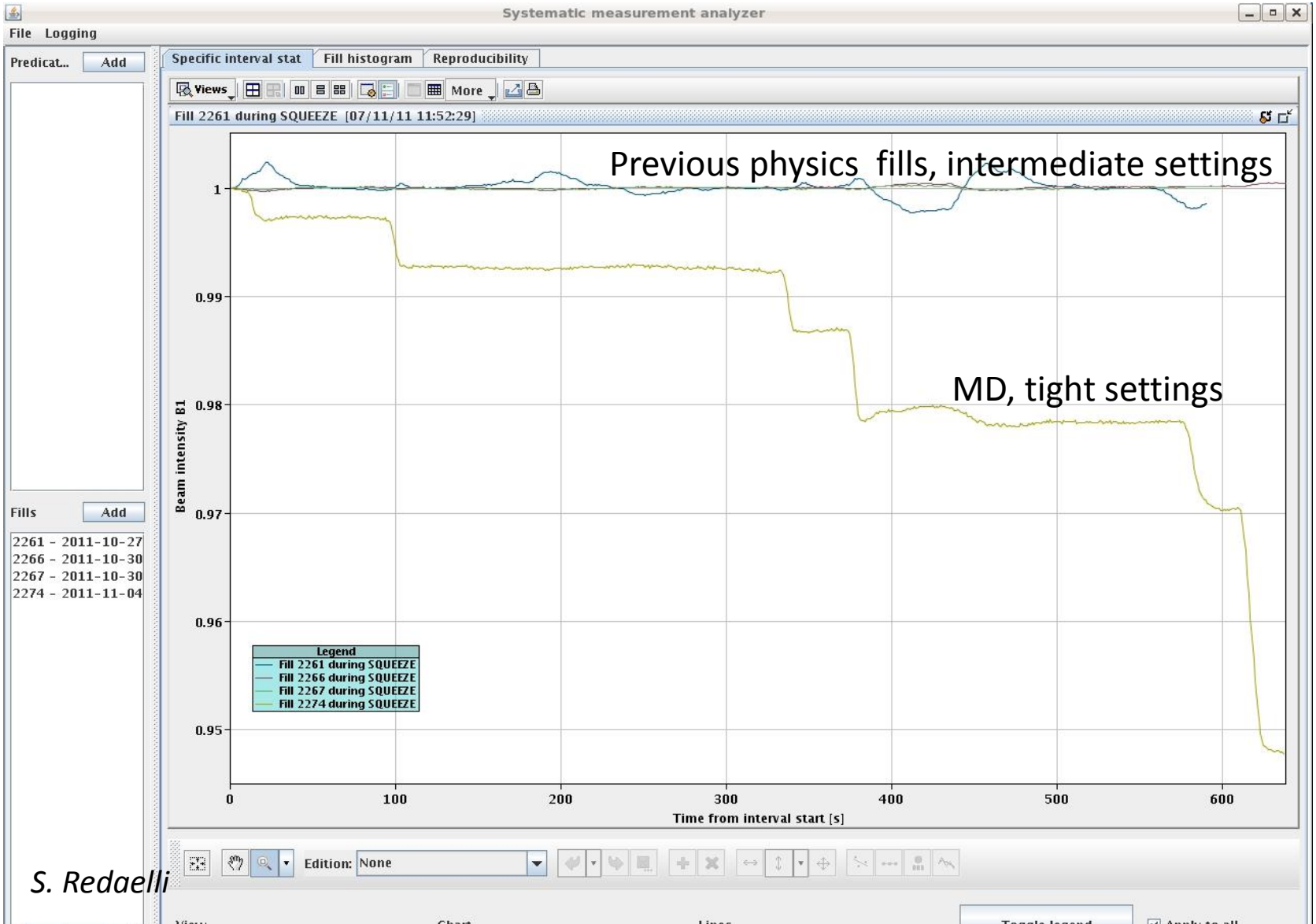
MD program

- 1 nominal bunch per beam
- Ramped using functions driving the collimators to tight settings
- Squeezed to $\beta^*=1$m (fall-back since ATS MD not yet done)
- Performed loss maps (hor., ver. and off-momentum)

Results: ramp and squeeze

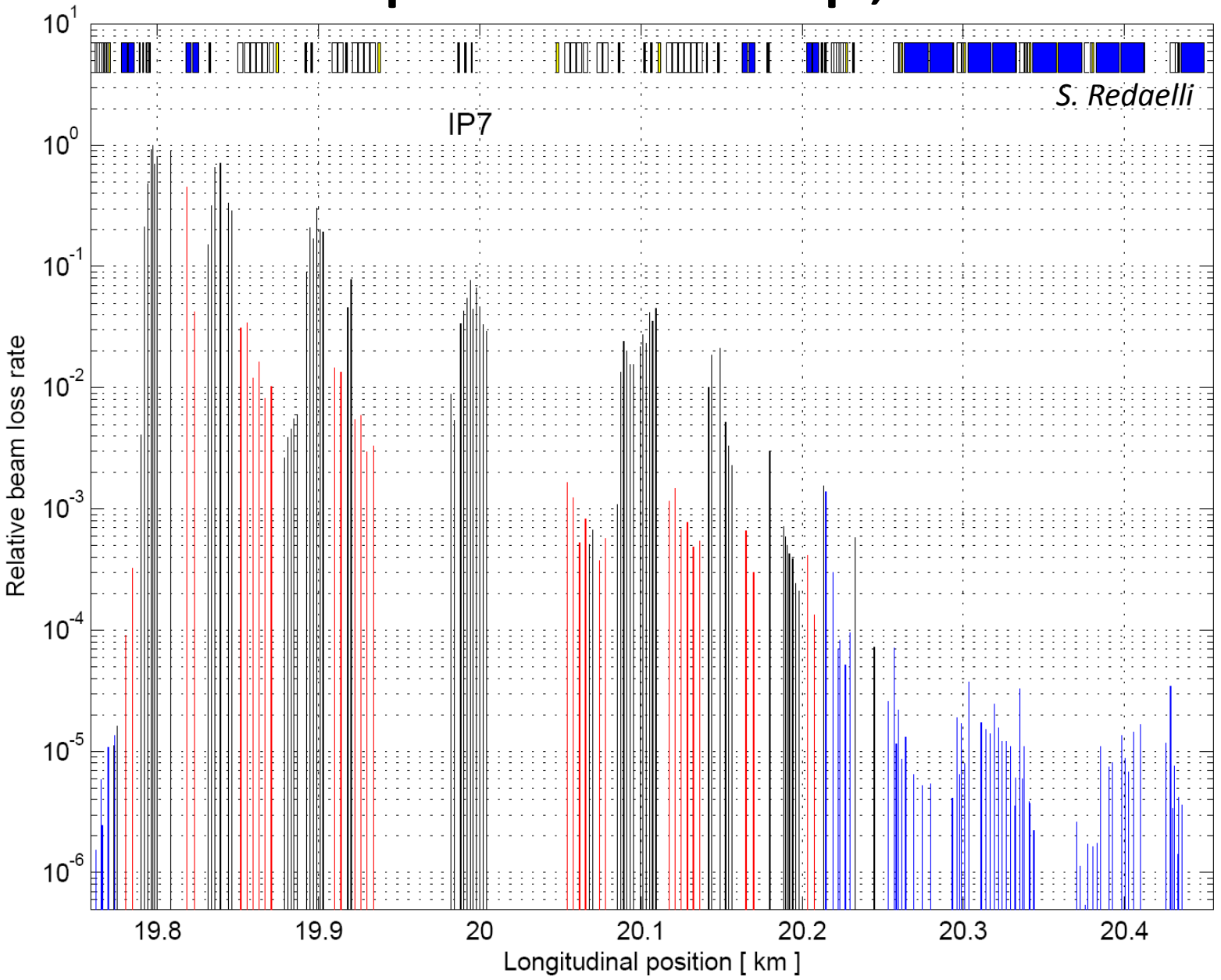
- Because of orbit oscillations
  - Some losses seen during ramp (~0.5% of beam)
  - Larger losses in B1 during squeeze (~5% of beam)

Losses during squeeze B1



S. Redaelli

Example: loss map, B1H



Results: loss maps

- Hierarchy well preserved – excellent long-term stability
- Cleaning inefficiency consistent with previous MDs (significant improvement wrt intermediate)
- Including Q7 to be on the safe side (same dump threshold as downstream BLMs)

Inefficiency	**B1**	**B2**
Horizontal	Q7R7: 7.2e-5	Q8L7: 1.3e-4
Vertical	Q7R7: 6.9e-5	Q8L7: 5.7e-5

Conclusions

- Excellent long-term stability of cleaning performance
- 5% of B1 lost during squeeze, 0.5% lost during ramp

$\Rightarrow$Promising concept for 2012 but better control of orbit oscillations in squeeze needed

- We still hope to test tight collimator settings with ATS optics and beta*=40cm in the future