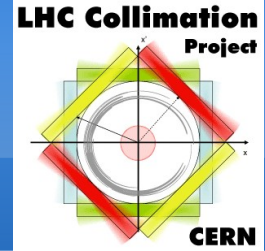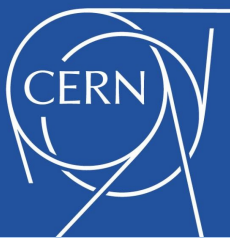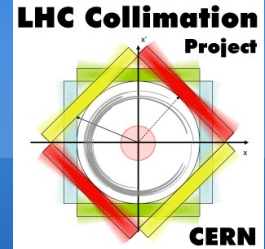# Update on ATS optics tracking simulation
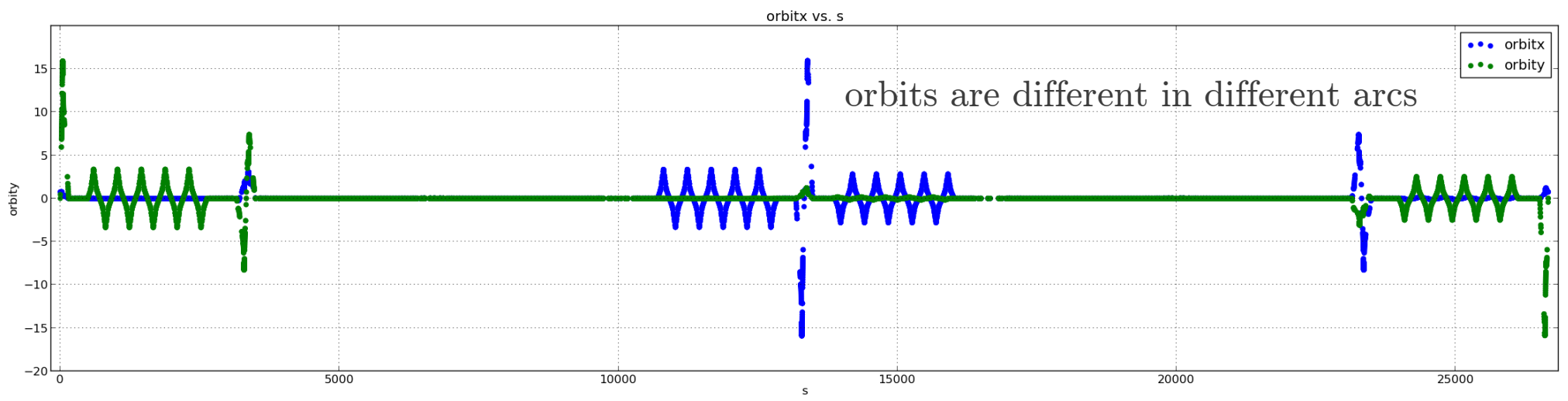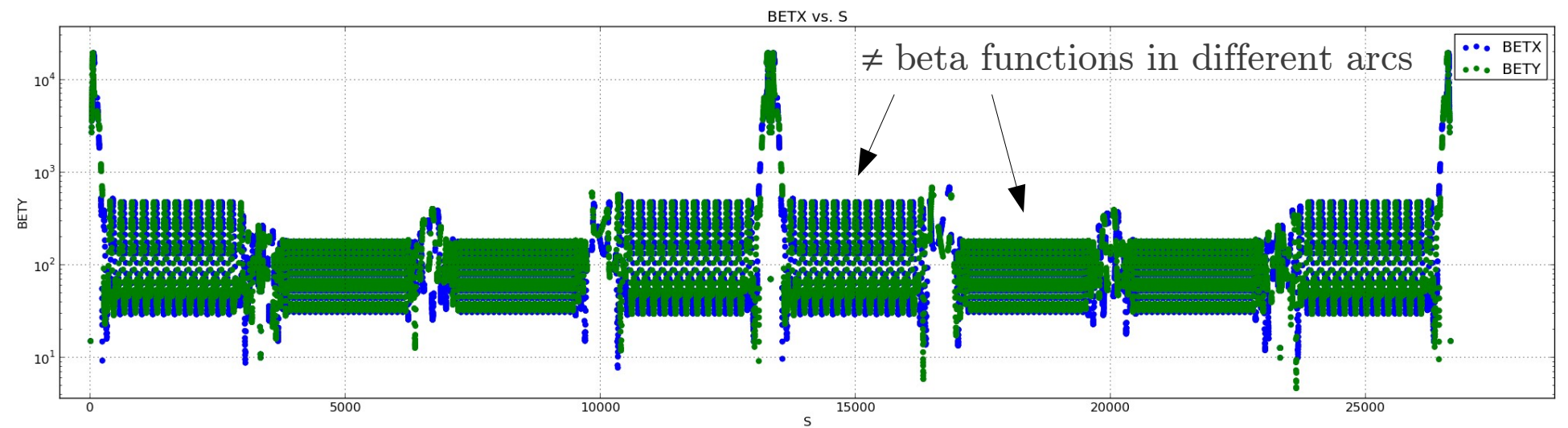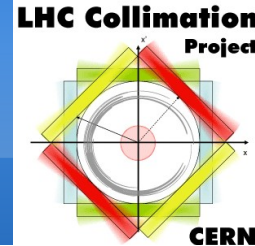*R. de Maria, A. Marsili, S. Redaelli*

Introduction

- ## Update on status of ATS multi-turn cleaning
  - cf. ColUSM #8 and #9: collimation setup with new optics, but missing the aperture and ''survey'' input files.

- ## ATS: Achromatic Telescopic Squeeze
  - Baseline option: $\beta^* = 15$ cm

- ## Using the SixTrack collimation version (loss maps)

- ## New set of simulations with updated aperture
  - ''Canonical'' 6/7 sigma settings for collimators, $\epsilon = 3.5\ \mu$m
  - Simplified conservative aperture layout: circular section for quadrupoles

BETX vs. S

≠ beta functions in different arcs

orbitx vs. s

orbits are different in different arcs

Do these optics changes and orbit offsets create critical problems with losses?

Machine configuration Collimators settings

Coll. setting	σ
TCP IR7	6.
TCSG IR7	7.
TCLA IR7	10.
TCP IR3	12.
TCSG IR3	15.6
TCLA IR3	17.6

Coll. setting	σ
TCLP	12.
TCLI	open
TCSTCDQ IR6	7.5
TCDQ IR6	8.
TDI	open
TCT IR1/5/8	8.3
TCT IR2	12.

- 7 TeV, 6.4 million particles, 200 turns

- Halo: 6 σ in the considered plan (= setting of primary) or less

- Parallel separation ON at all IP (most critical case for aperture)

- dp/p OFF ; dispersion corrected (RdM, ColUSM #8)

- No beta beating, no offset or tilt

- Preliminary results – nominal machine without imperfections

Old
New
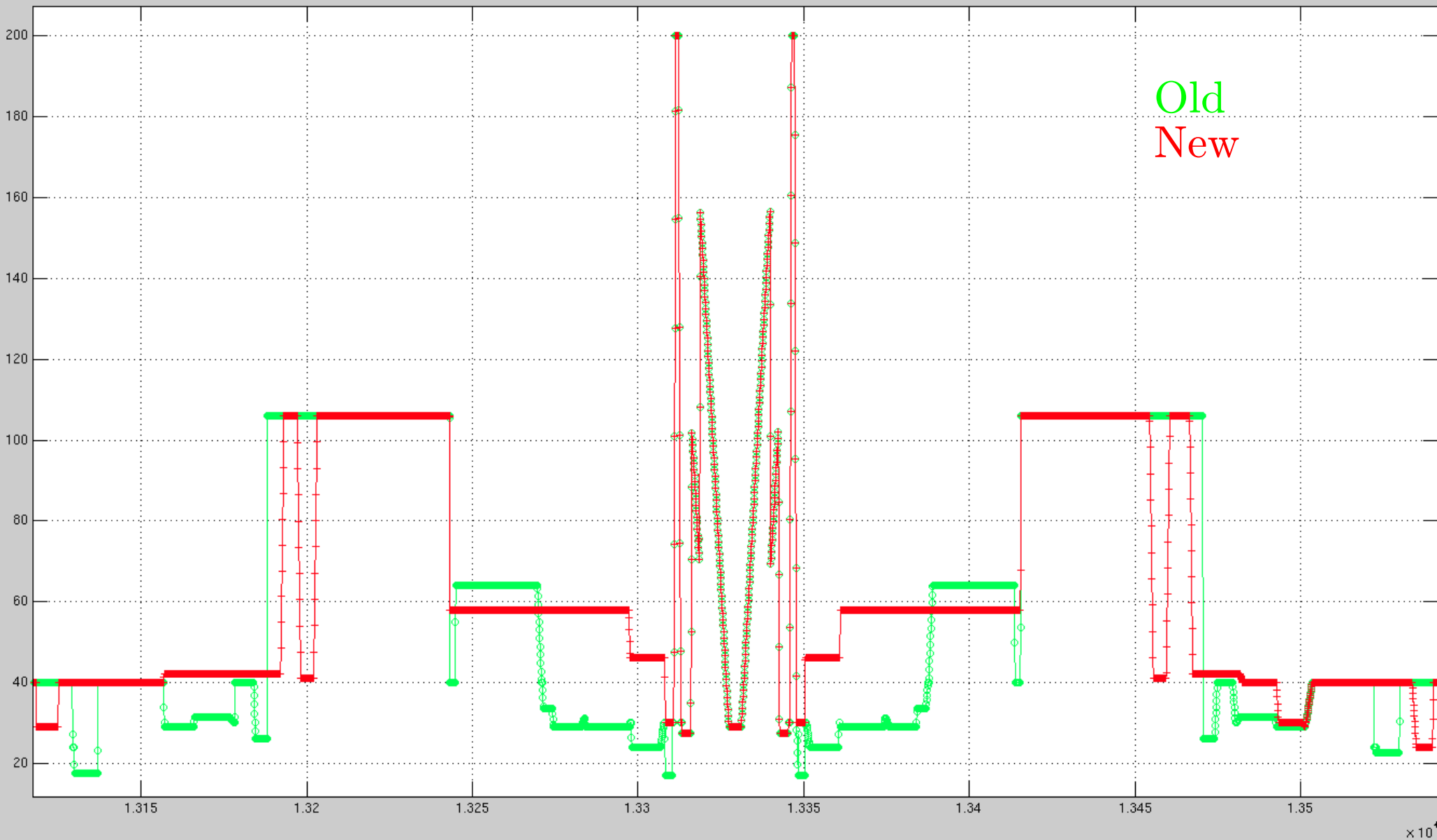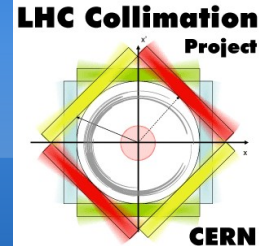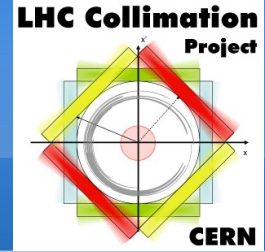
Simulation results
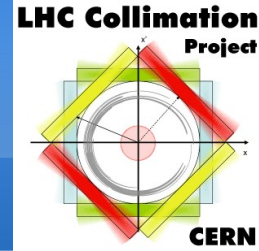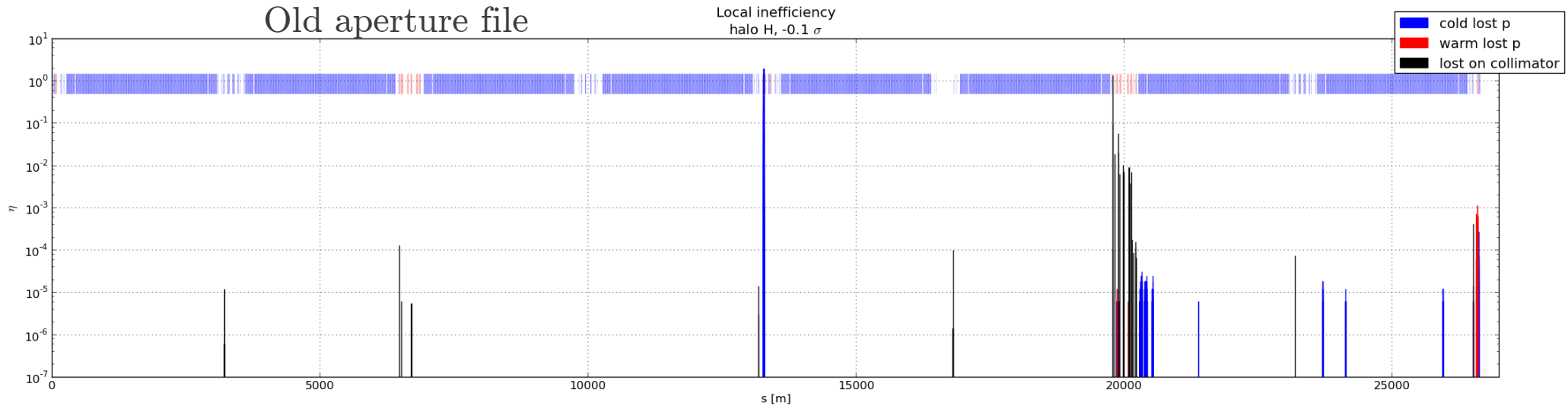## (preliminary)

Old aperture file

Local inefficiency
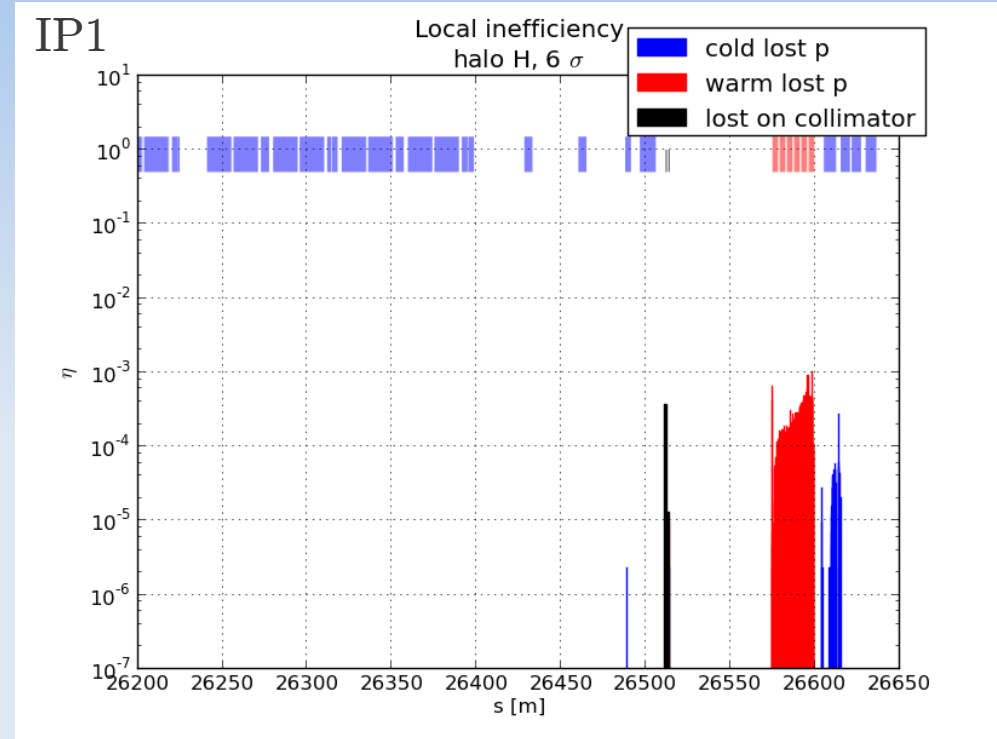halo H, -0.1 σ

- cold lost p
- warm lost p
- lost on collimator

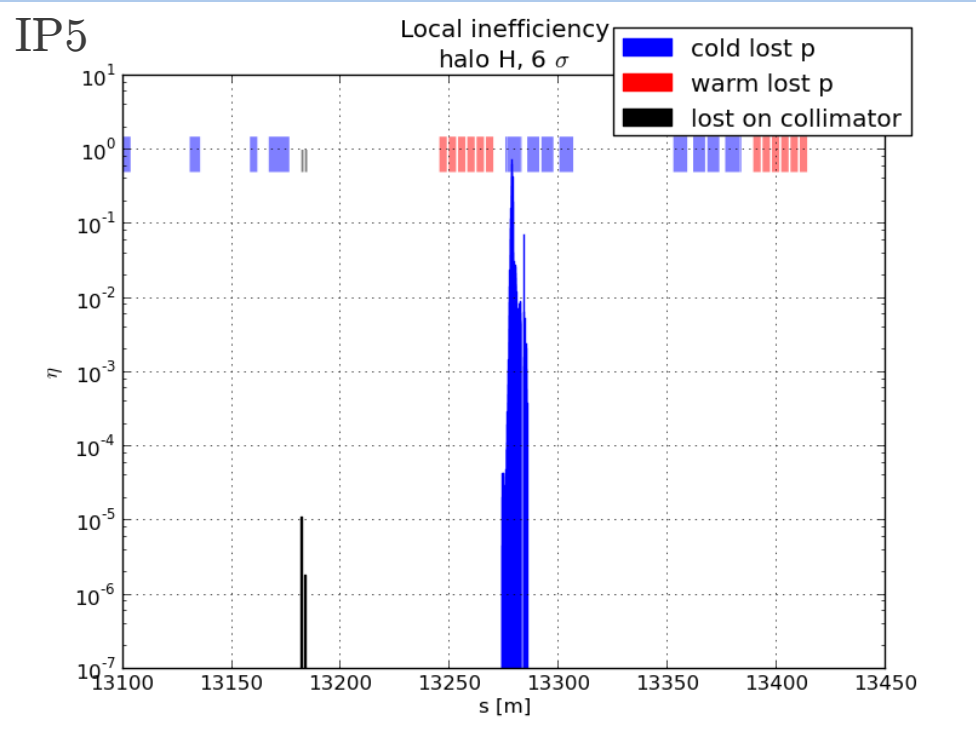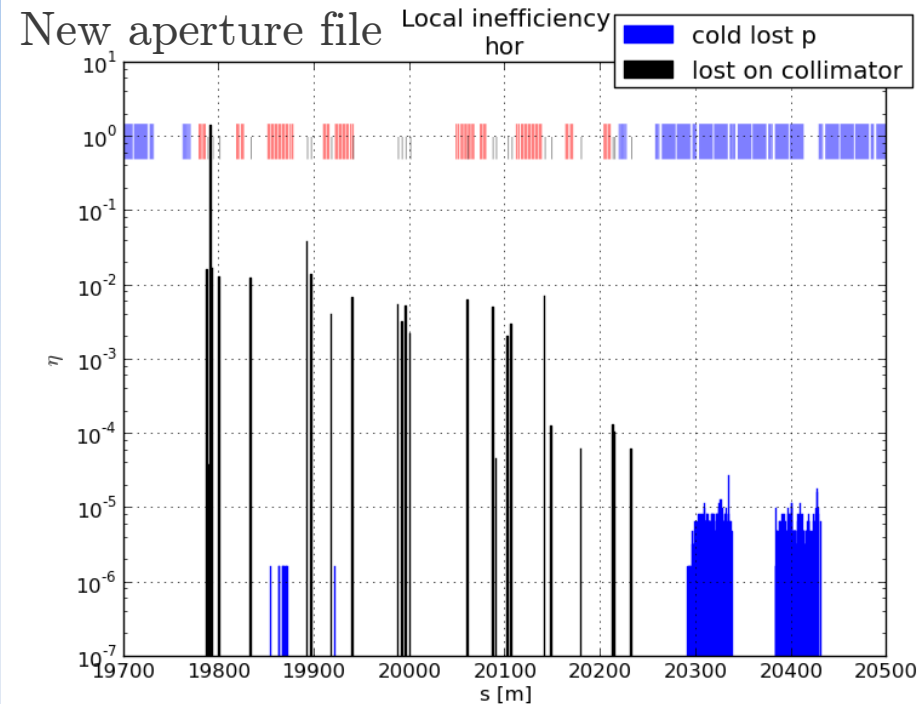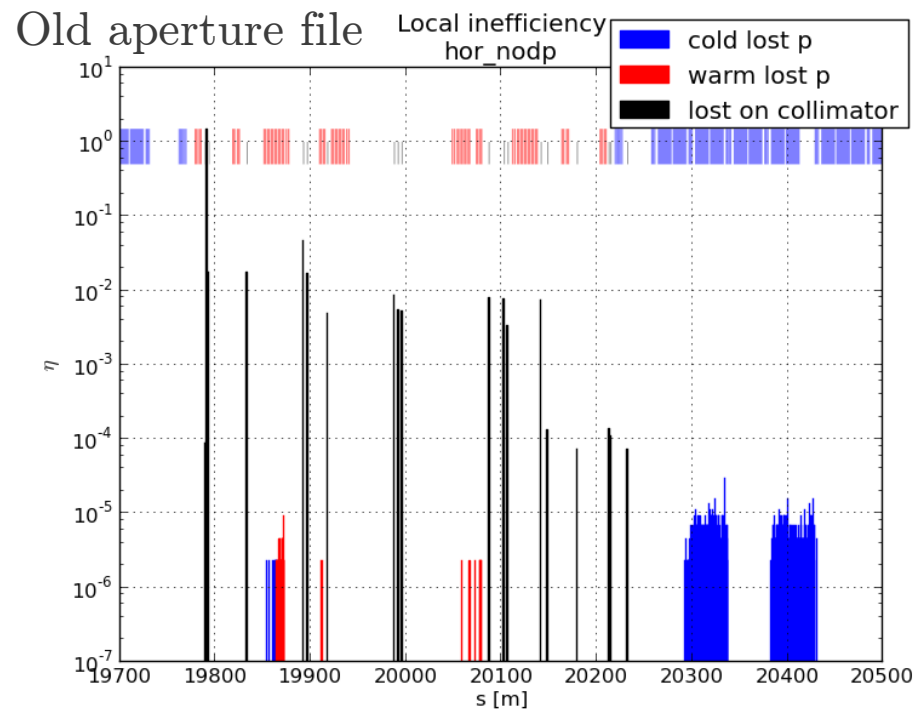## Main differences in the triplets

Updated aperture file

Local inefficiency
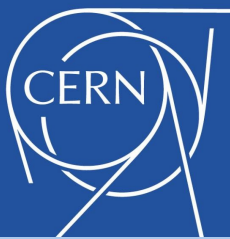hor

- cold lost p
- lost on collimator
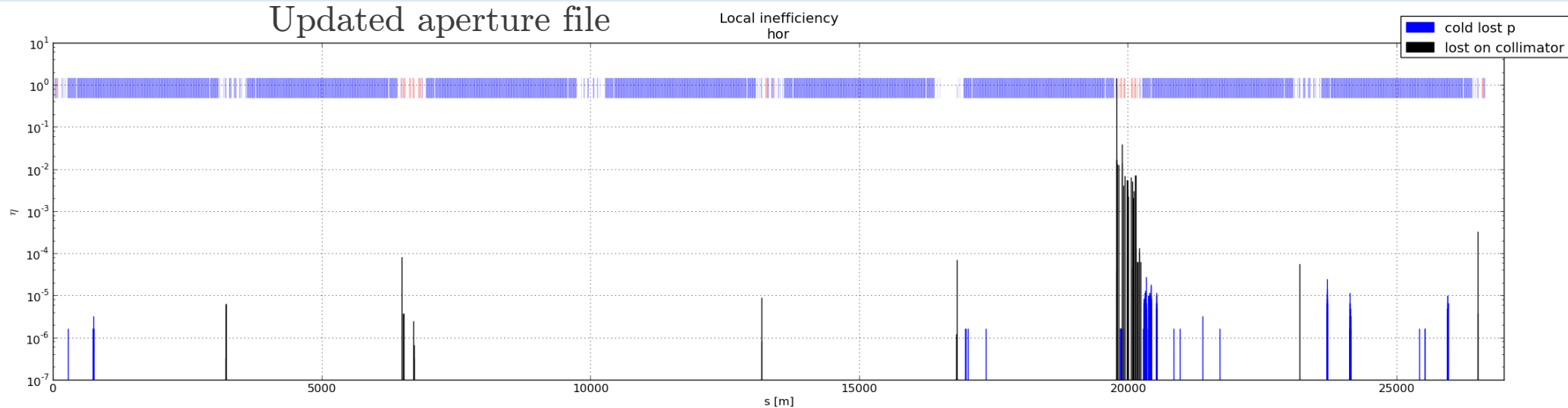
- Before: high losses in triplet L5 and L1
- Losses disappeared after updating the aperture file
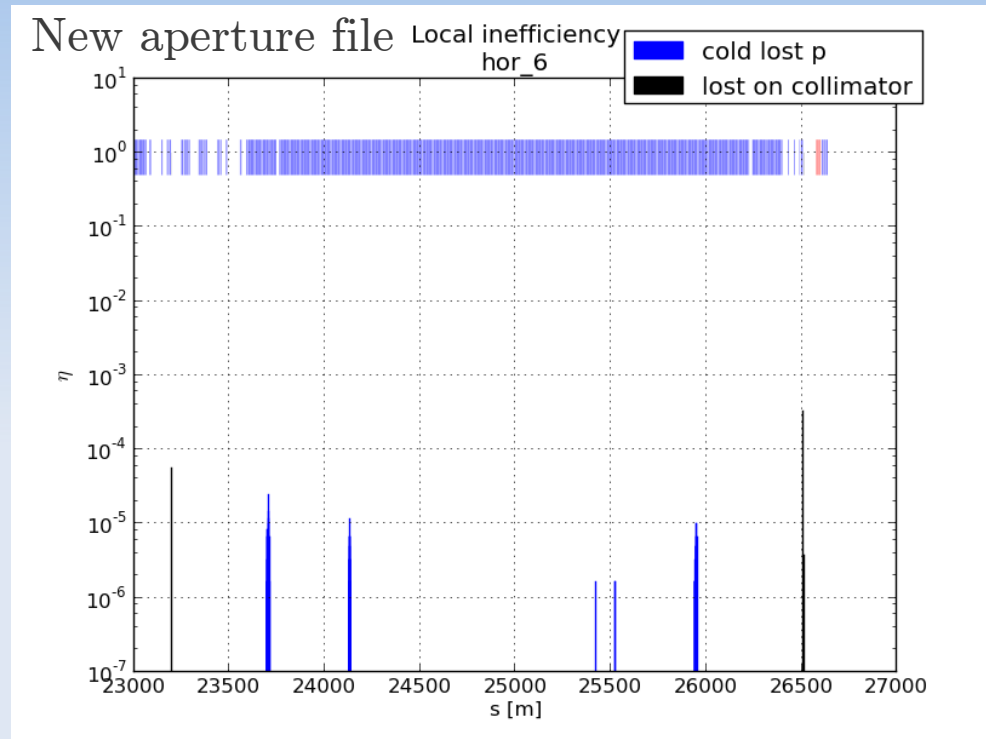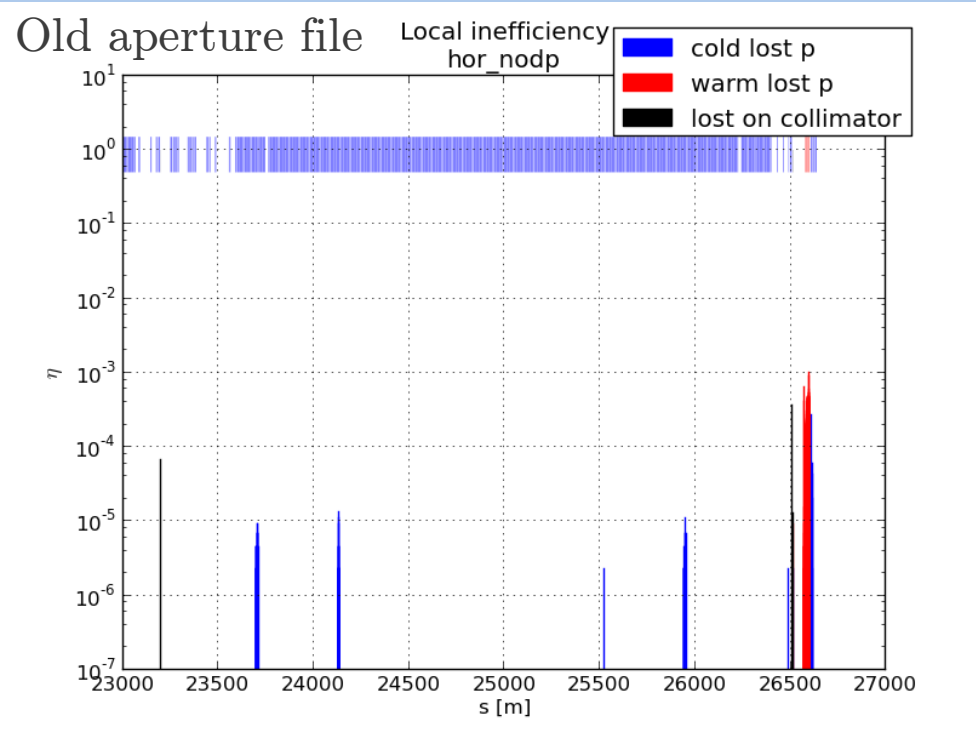
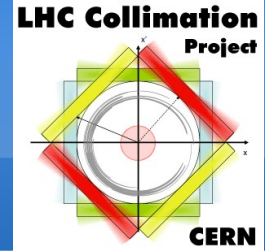- Losses in ar 81 at the level of the loss in dispersion suppressor R7.

- Still there with updated aperture.

Old aperture file

New aperture file

- No important change
- Note the losses in the DS at $\eta = 10^{-5}$

Conclusion

- Updating the aperture had a major influence on results, in a good way

- Limiting area is now the arc 81

- Still some tweaking needed:

  - Which halo parameter is the most representative? 6, 5.9, 5.8?

  - Update the ''survey'' post-processing file

  - Compare with nominal 7 TeV, 55 cm