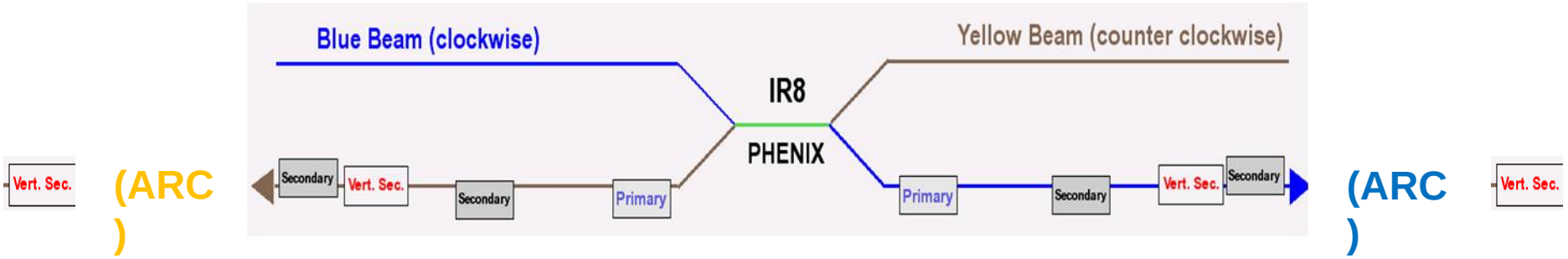
A. Drees, G. Robert-Demolaize

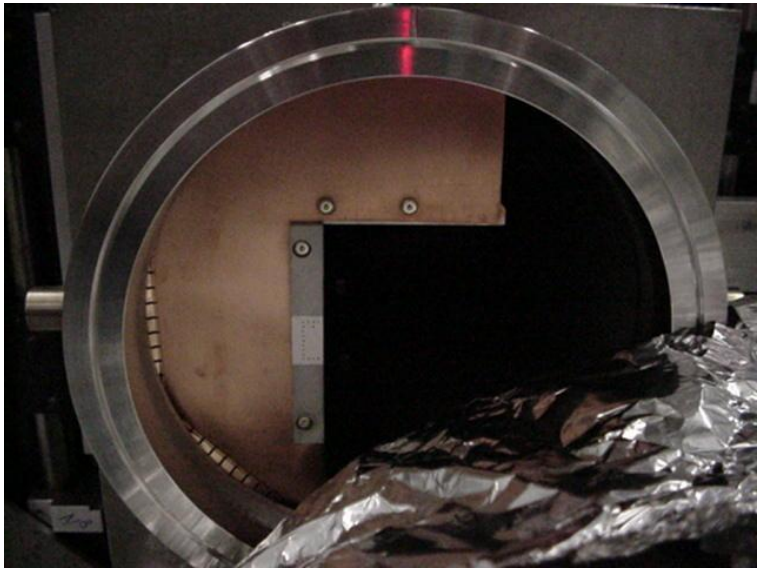
Proton Collimation Efficiency

COLLIMATION LAYOUT



- Pin diodes are installed at least 1m downstream of each collimator to get a direct loss signal when setting their position.

- An additional secondary vertical collimator is located one arc downstream for both Blue and Yellow (not used).



PREVIOUS COLLIMATION STUDIES

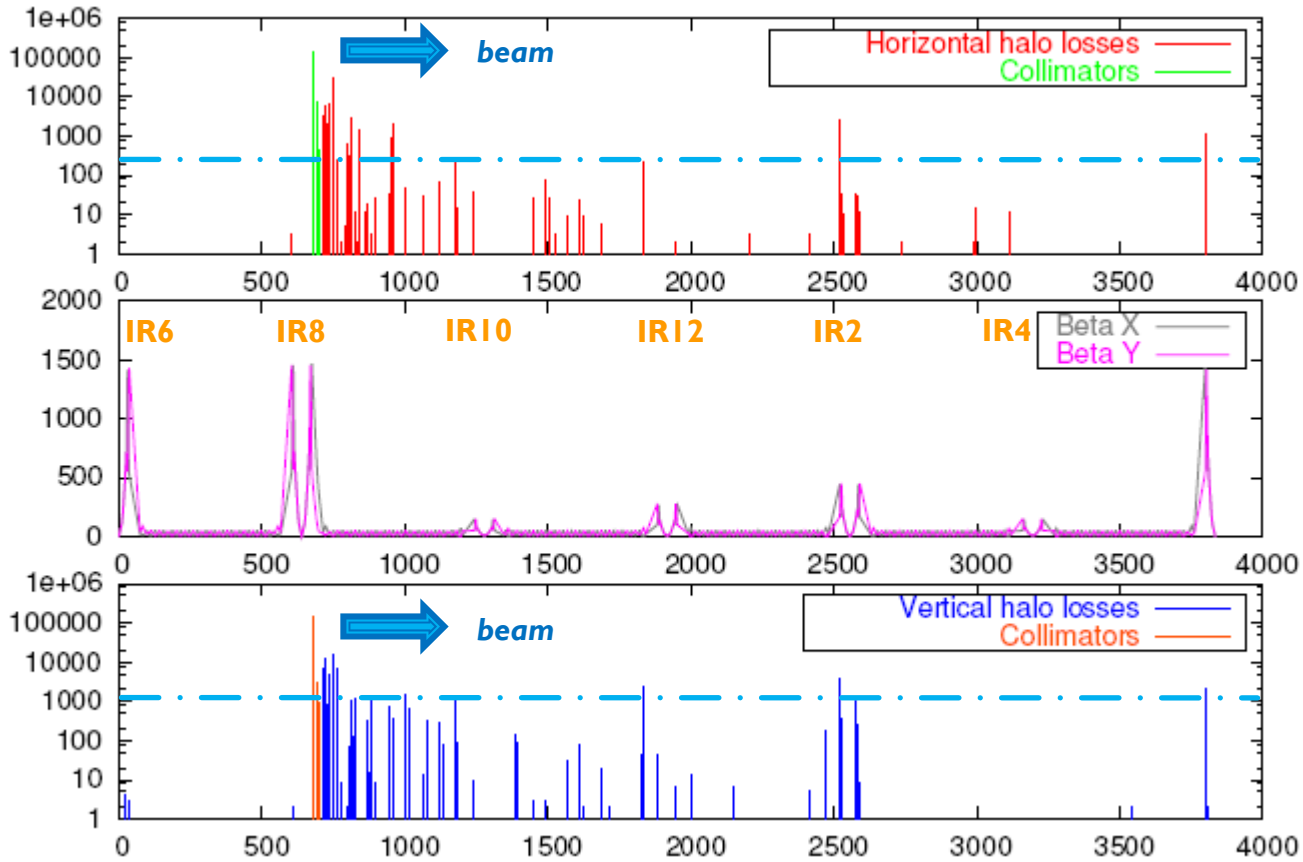
- Main goal of RHIC collimation: reduce background levels in experimental regions.

- Live measurement during previous proton runs were compared with predictions from tracking codes for collimation with the primary jaw only
  => good agreement on loss locations, BLM signal still being studied

- Simulations for the efficiency of the full system is currently ongoing, using live lattice models and reproducing real machine conditions (tunes, orbit, emittance, collimator openings).

SIMULATED LOSS MAPS

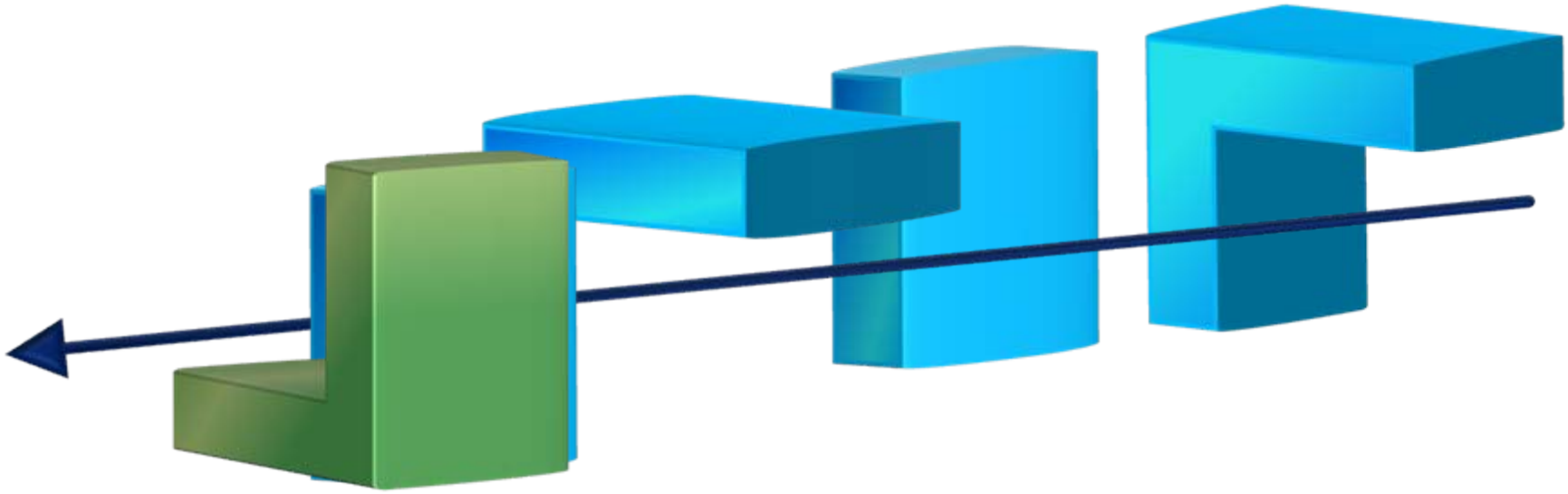
(PRELIMINARY)



- Blue beam at store, E = 100 GeV, PP23 ramp, β^*(STAR, PHENIX) = 1m, full system
- Vertical halo losses are ~5 times larger than in the horizontal halo case !!

PLAN FOR COLLIMATION UPGRADE

- Current plan is to use another L-shaped collimator instead of the last secondary in IR6 (horizontal secondary) and the one in the arc downstream (vertical secondary)



- By using this last secondary, one can predict how the "new" collimator may improve the background in the experimental insertions.
- Both L-shaped jaws might also be used for beam collimation during the ramp…

USE OF APEX TIME

- Experiment would be performed on the Yellow beam line (known issues with the Blue collimator in IR8).

- Step 1: drive the secondary collimator in IR4 towards the beam halo and compare BLM data with simulation results => good estimate of the cleaning efficiency of the upgraded system

- Step 2: scan the beam halo and its formation during ramps => would allow specifying collimation requirements on jaw positions, orbit stability and reproducibility