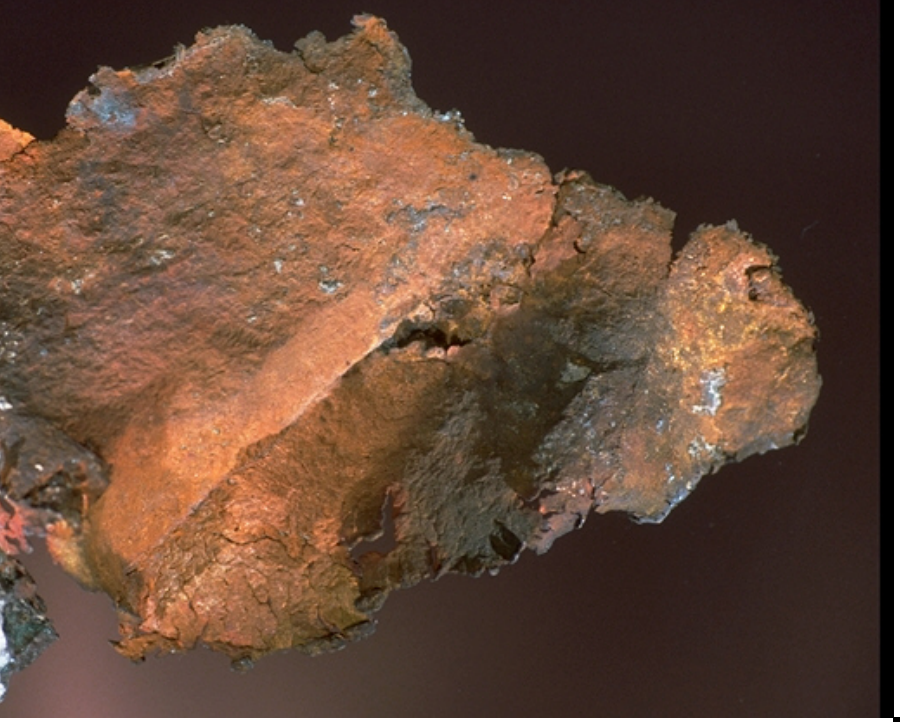
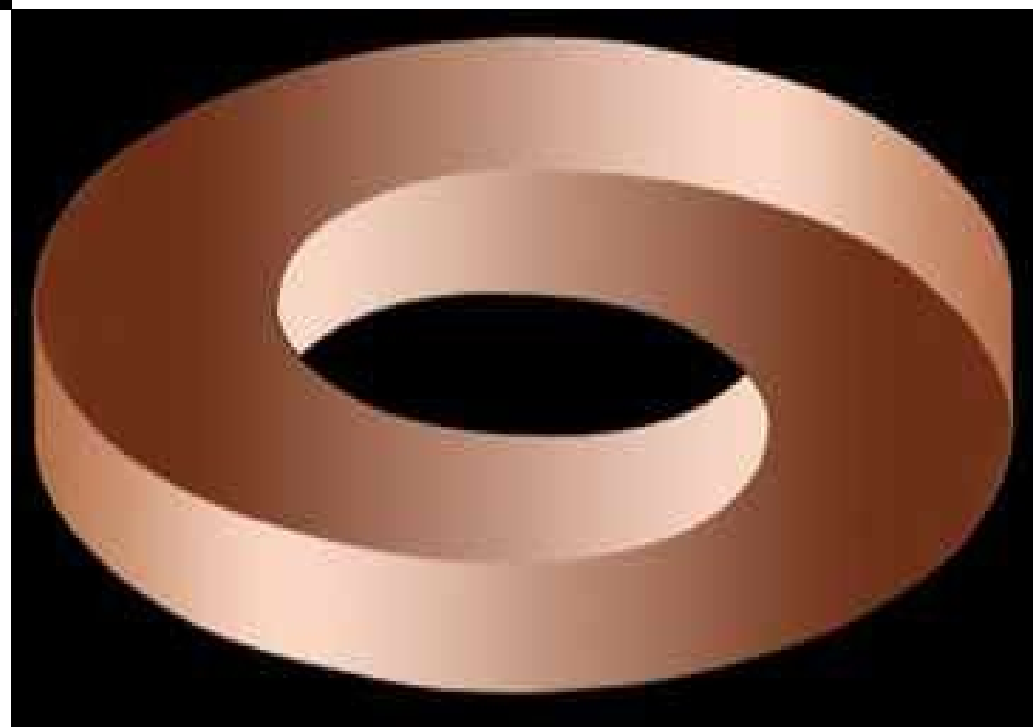


Run-5 Update

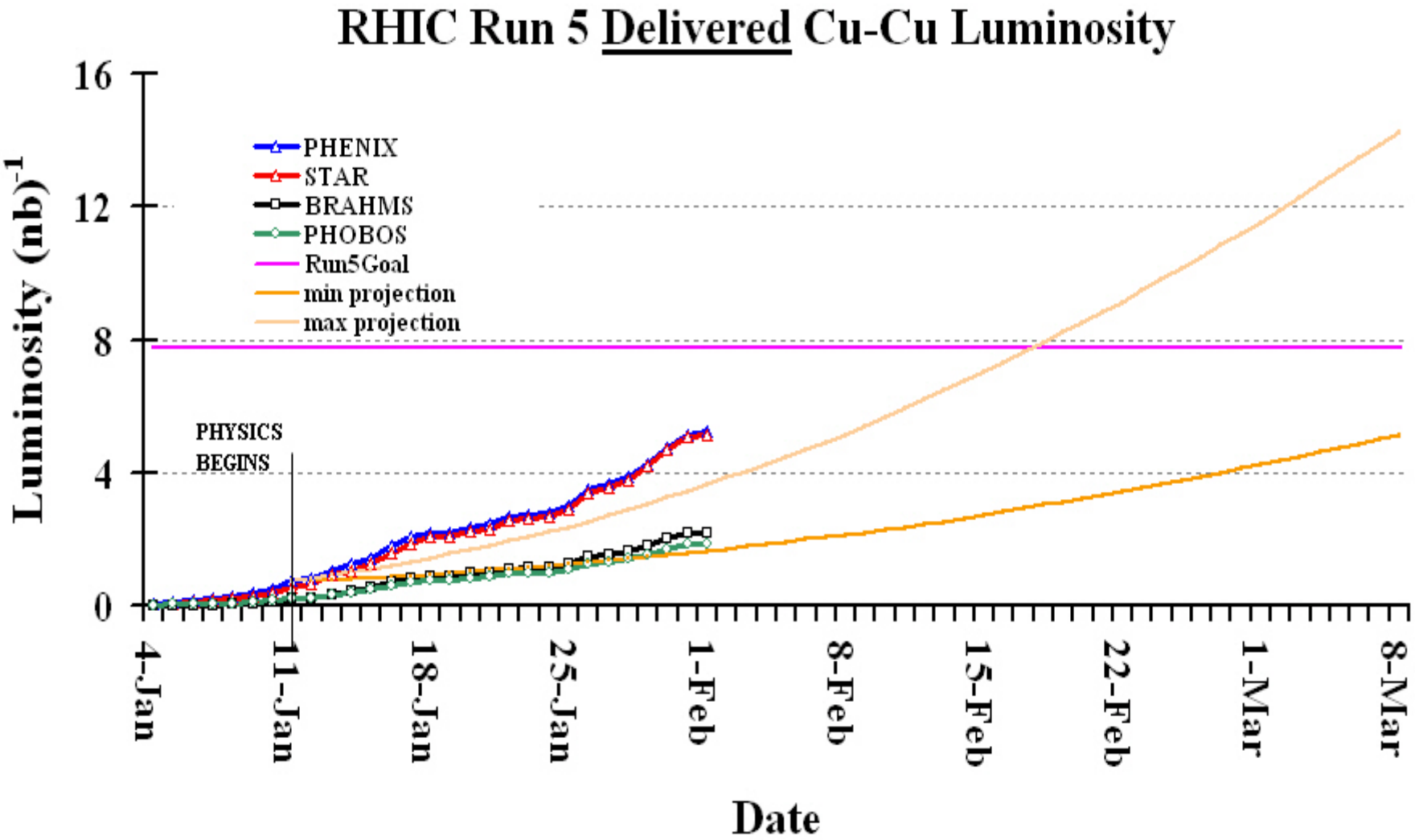
BROOKHAVEN
NATIONAL LABORATORY

Machine-Experiment
February 2, 2005



Status: 3 weeks

Total from January 11 (nbarn-1)	
Phenix:	4.49
STAR:	4.58
Brahms:	2.01
Phobos:	1.67



Week 3 - Highlights

Production ramp: 37x37 4.5e9

- No more emittance blow-up at transition *(Thomas)*
- Emittance end of ramp **15-17 pi** (PLL on low excitation)
- Transmission 90-94%

→ **Initial rates** 40K+,
Backgrounds under control

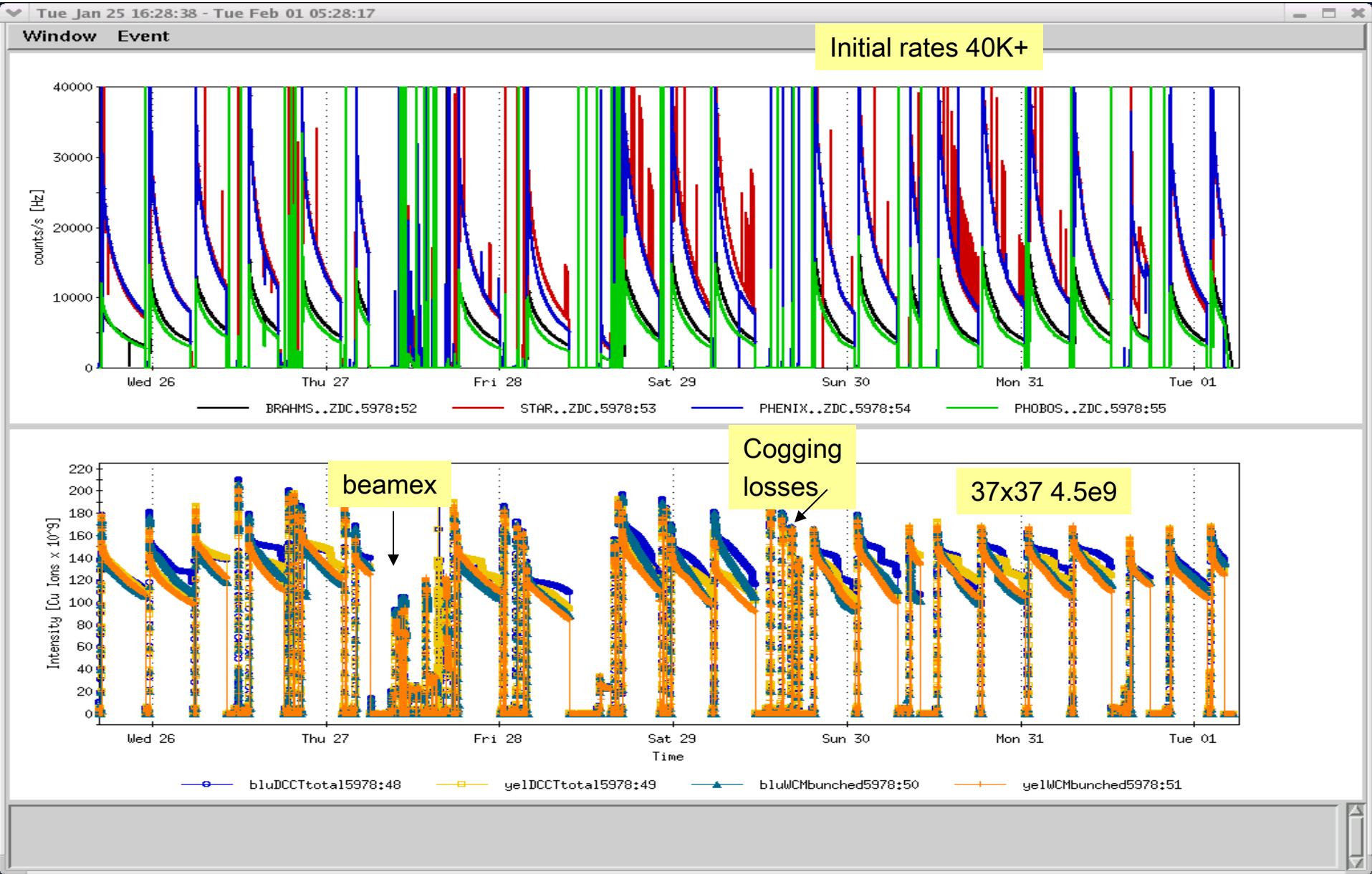
- **Re-bucketing** improvement *(2xMike, RF group)*
- **Common cavities**

- **gap cleaning** working on store *(Angelika)*
- **IPM, Schottky** improvements *(Rob, Roger, Kurt)*
- **RHIC Injection** improvements *(Wolfram)*

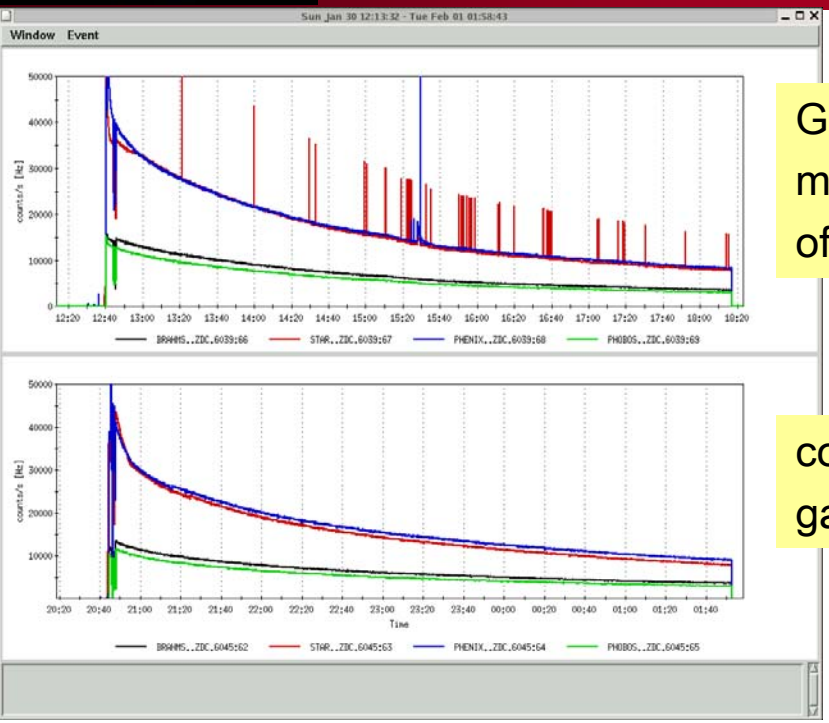
Beam Experiments – spin-off

- **online matching** works *(Nikolay, Todd, Fulvia)*
- **beta*** measurements consistent with ~0.89 at star. ~1m at Phenix, ~2.5 at Brahms, ~2.8 at Phobos →collision ratios *(Mei)*

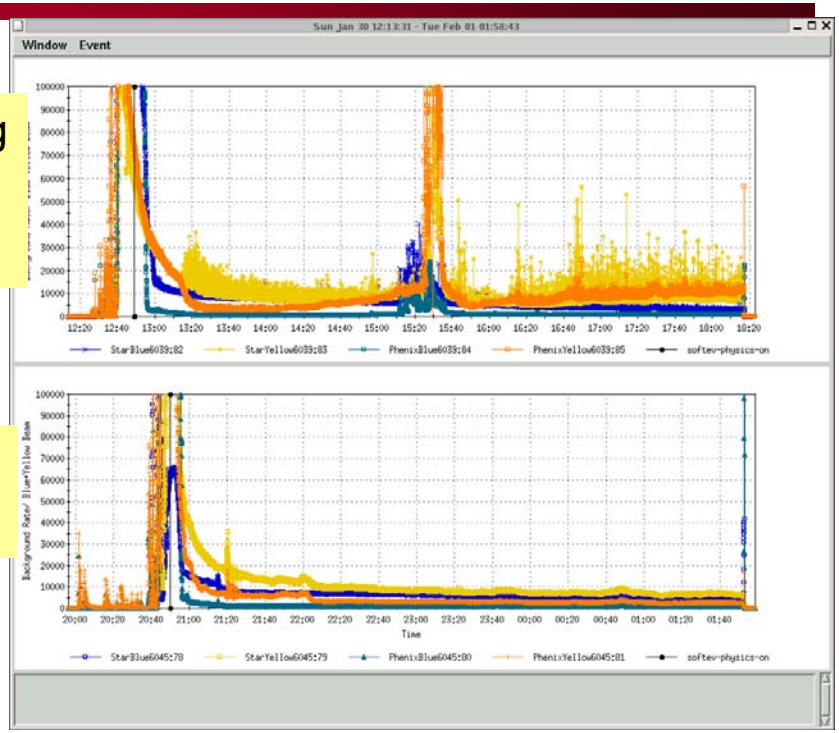
Intensity/collisions – Week 3



Gap cleaning is back

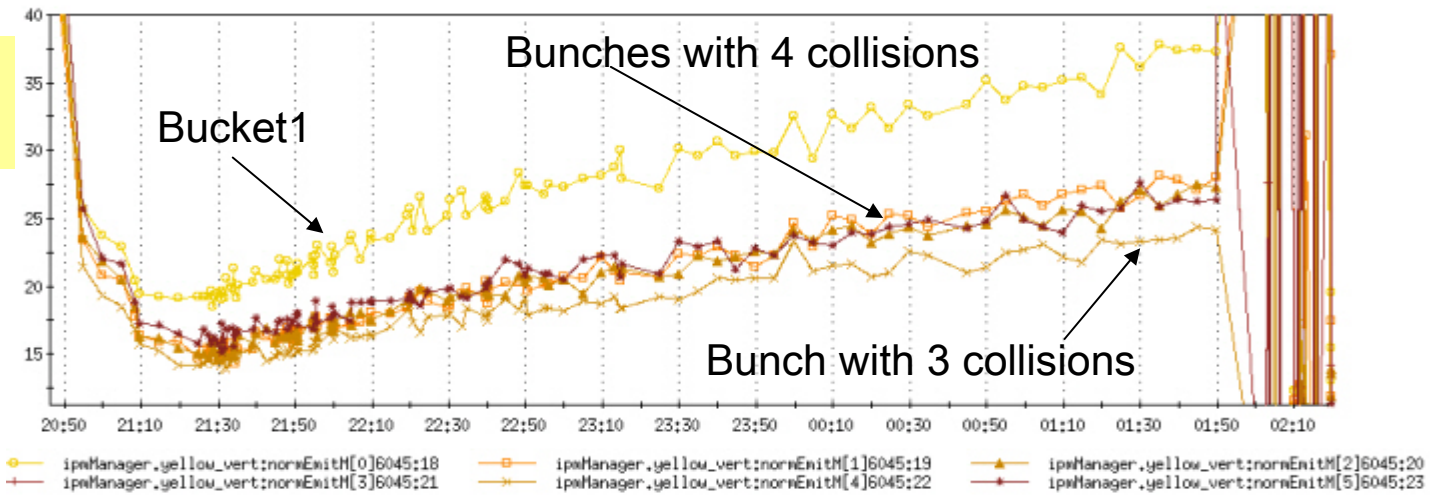


Gap cleaning mid and end of store



continuous gap cleaning

Emittance on store



Lumi develoment vs. flat running

- There is no such a thing as “flat running”: if there is no development, performance deteriorate, do not stay constant
- Discuss degree of development and lumi goals, amount of invested development time
- Detectors are limited by background (beam and collision related)
- Running machine for highest performance impacts reliability

→find optimum

Intensity development

Assuming β^*=0.90, emittance at the beginning of store 18π

Cu-Cu Xsection 2.6 barn, 37 bunches

Bunch intensity at lumi	Transverse Emittance (pi)	Initial collision rates (KHz)
4.2	18	42
4.5	18	48
4.8	18 (20)	54 (49)
5.1	18 (20)	62 (55)
5.4	18 (22)	69 (57)
5.7	18 (22)	77 (63)
6.0	18 (24)	85 (64)

Running time and time

- Weather, power dips
- Accesses

analysis of deviation from time estimates, “get personal”

- System problems

Failure→ops resets→support→system expert→system expert drives in →troubleshooting→fixing

(identify possible improvements)

- Time between stores

Data are collected by operation, sufficient stats to identify recurrent problems

- Time beginning of store

Collider: goal 10 minutes (auto LISA+ auto-collimation)

Phenix: ~25 minutes for clock change, STAR ~20-25 to turn on HV, etc.

Any possible improvement there?

Lumi Development

Next: optimization beginning of store:

- **BBA + Orbit**, IR6, IR8, vertical Y rms (Todd, Vadim)
- New '**lumi' stone** after rebucketing (Steve)
- Automatic LISA **steering, collimation** (Angelika)
- IR corrections yellow

Strategy

- **Increase bunch intensity** to **5.5 e9**
- *Increase progressively **number of bunches***
- *Commission ramp for **new working point***