

APEX Summary:

December 18-19

December 26

January 1-2

Beta squeeze + selected others.....

Fulvia Pilat

Time Meeting, January 8, 2008

Beta squeeze

Merging proposals 8-17 and 8-15

TEAM:

Overall Planning

Pilat, Litvinenko

Ramp design

Tepikian, Malitsky

PS testing, QPA tuning

Bruno, Louie

Tune feedback

Della Penna

Ramp & store tuning

Satogata, Ptitsyn, Trbojevic

Optics measurements

Bai

Coupling correction

Luo

Collimation

Drees

Beta squeeze: summary

dAu80 (design) 1m in Yellow and Blue

dAu81 (design) 0.7m Yellow and 1m in blue

dAu82 (design) 0.7m in Yellow and Blue

Expected increase in rates → 30% (basically what we got, see later)

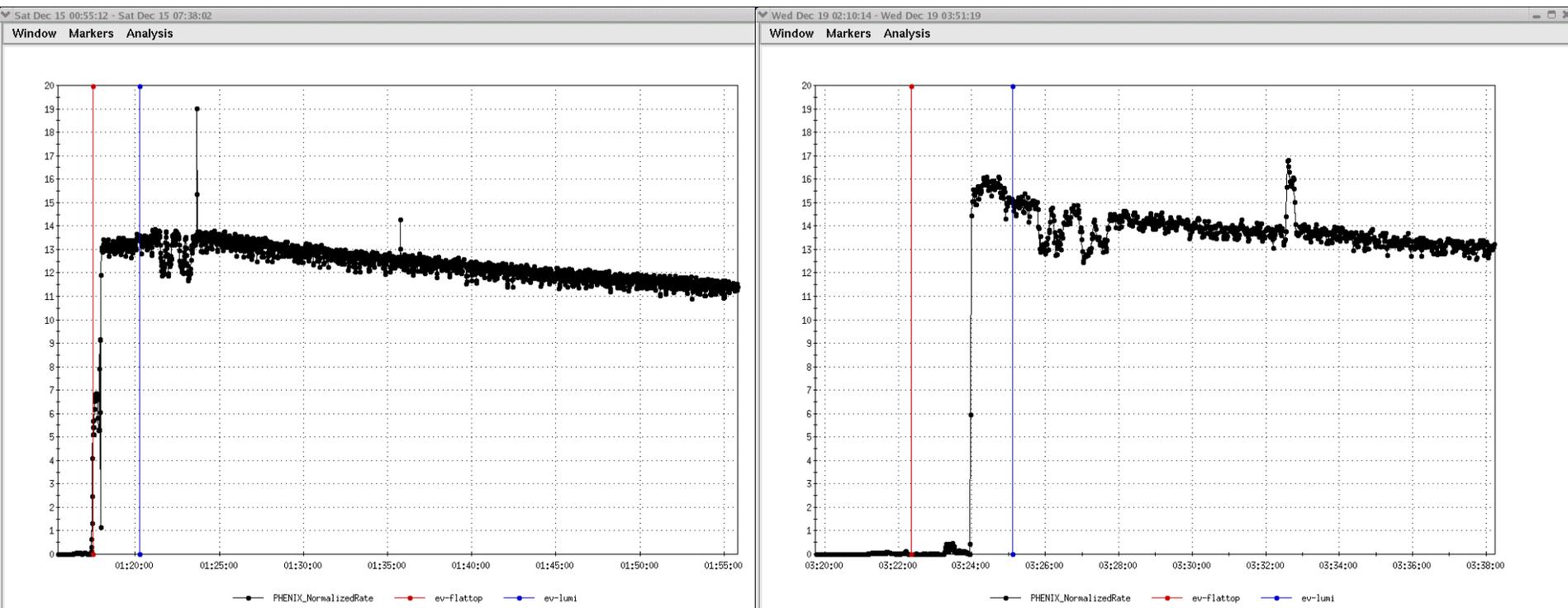
- Was done in 2 steps because at the start we thought we had a problem with unequal beam sizes. With the 20/20 hindsight the squeeze could have been done in parallel....
- Even so → rather efficient use of APEX time and development

Beta* chronology

Dec 12	6h APEX	dAu81, feedback, reply, 6 bunches
Dec 13	4h dev	test 56x56 ramp →revert to dAu80
Dec 18	4h dev	Work on physics store
Dec 19	6h Apex	Turn dAu81 to operations
Dec 26	6h APEX	Development of dAu82 (3 ramps!) Turn d-Au to operations
January 1-2	6h APEX	work on beta* measurements and waist location

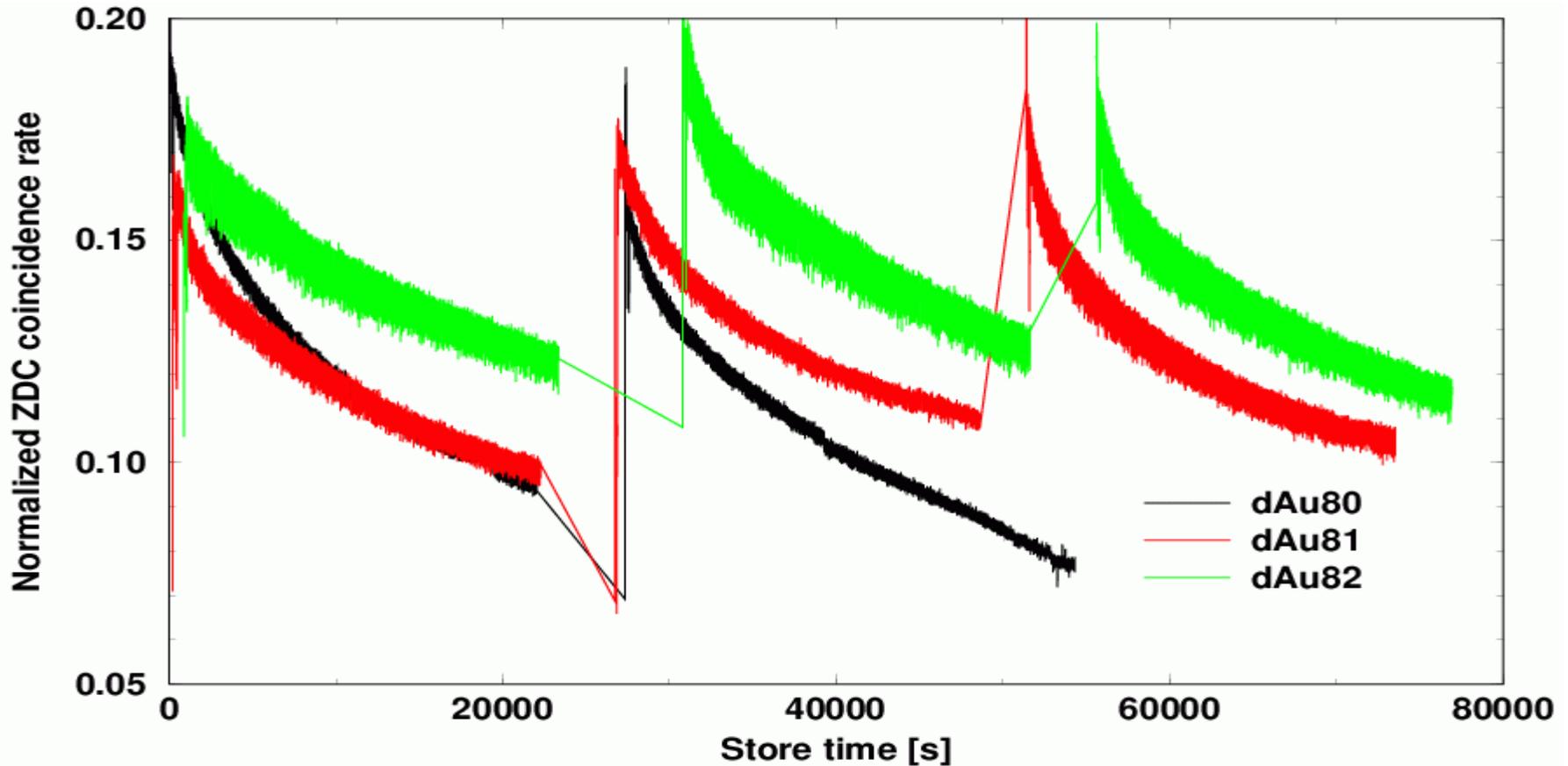
Total scheduled time for development of dAu81+dAu82: **~26h**

Normalized collision rates d-Au80 vs. d-Au81



14:15 Concerning Kip 's note for 3:29am e-log entry. Shown here are **normalized PHENIX rates** (normalized on product of beam currents) for store **9399 (left)** and the store **9430 (right)**. Store 9430 was with reduced by $\sim 30\%$ Yellow beta-functions, so one should expect $\sim 15\%$ luminosity gain. And even not considering possible difference in the emittance between those two stores, the normalized rates at the very beginning of 9430 are higher that on 9399 by the amount close to the expected 15% ($15.5/13.5 = 1.15$). -VP

dAu80/81/82 normalized rates



- On average, we have gained about 20% increased normalized lumi with each step
 - Luminosity ratios are typically about 1.45 : 1.2 : 1 (PHENIX)

APEX Schedule January 1-2 2008

End of physics store	Store 6 bunches	Ramps (Physics-like)	Store 12 bunches (No collisions)	Ramps (high bunch Intensity)	Store 37 bunches (Rebucketing Collisions)	
08-17 Alpha* Knobs Satogata Malitsky	08-27 Optics AC dipole Bai	08-14 Collimation on the ramp Drees	08-17 Beta* measure Ptitsyn Litvinenko	08-31 Transition instability Ptitsyn Fischer	08-17 Move collision point (fine cogging) Fischer	
8pm	9pm	11pm	1am	3am	6am	8am
						

Data for both rings from individual gradient changes. Blue lattice included non-zero tq4 at IR8 region. (Ptitsyn)

	Yellow				Blue			
	IR6 H	IR6 V	IR8 H	IR8 V	IR6 H	IR6 V	IR8 H	IR8 V
β^*,m	0.80	0.88	0.85	0.89	0.81	0.73	0.71	0.75
s^*,cm	-34	-33	2	30	-5	-3	20	5

- Blue beta* and waist at IP8 before Todd applied his knob

- H beta*: 0.65+-0.02@-0.34+-0.01
- V beta*: 0.72+-0.04@-0.33+-0.03

- First knob trial:

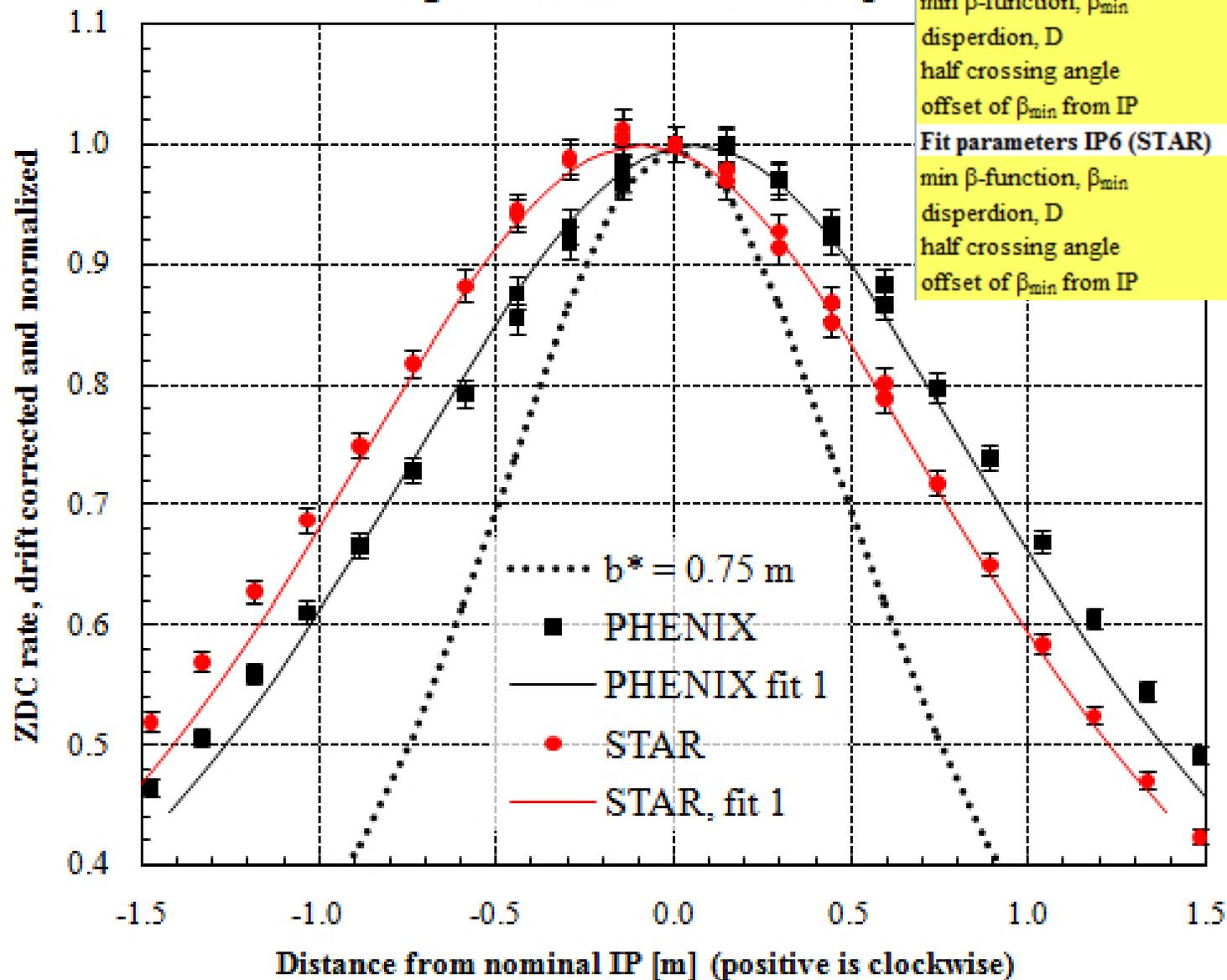
- H beta*: 0.6+-0.02@-0.35+-0.02

- Second knob Trial:

- H Beta*: 0.63+-0.02@-0.15+-0.01
- V beta*: **0.64+-0.02@-0.36+-0.01**

(Bai)

Longitudinal scan of collision point



Fit parameters common to IP6 and IP8

rms bunch length, σ_z	m	0.30
rms momentum spread, $\delta p/p$...	8.0E-04
norm. rms emittance ϵ_n	mm mrad	2.50

Fit parameters IP8 (PHENIX)

min β -function, β_{\min}	m	1.32
dispersion, D	m	0.00
half crossing angle	mrاد	0.00
offset of β_{\min} from IP	m	0.055

Fit parameters IP6 (STAR)

min β -function, β_{\min}	m	1.32
dispersion, D	m	0.00
half crossing angle	mrاد	0.00
offset of β_{\min} from IP	m	-0.093

APEX Schedule

January 9 2007

6 Au bunches with different intensities BBQ	Store Limited #bunches	Injection	Mostly ramps	
08-36 IBS measurement: Coupled and decoupled	06-31 ORM data (dAu82)	08-29 Profile with Cni polarimeter Huang, Sivertz, et al.	08-14 Collimation on the ramp	Back 2
Fedotov Fischer, Ptitsyn	Satogata, Bengtsson	08-28 Hybrid Tune Tracker Cameron et al.	Drees	physics
5am	8:30am	12:30pm	2:30pm	4:30pm 5pm