

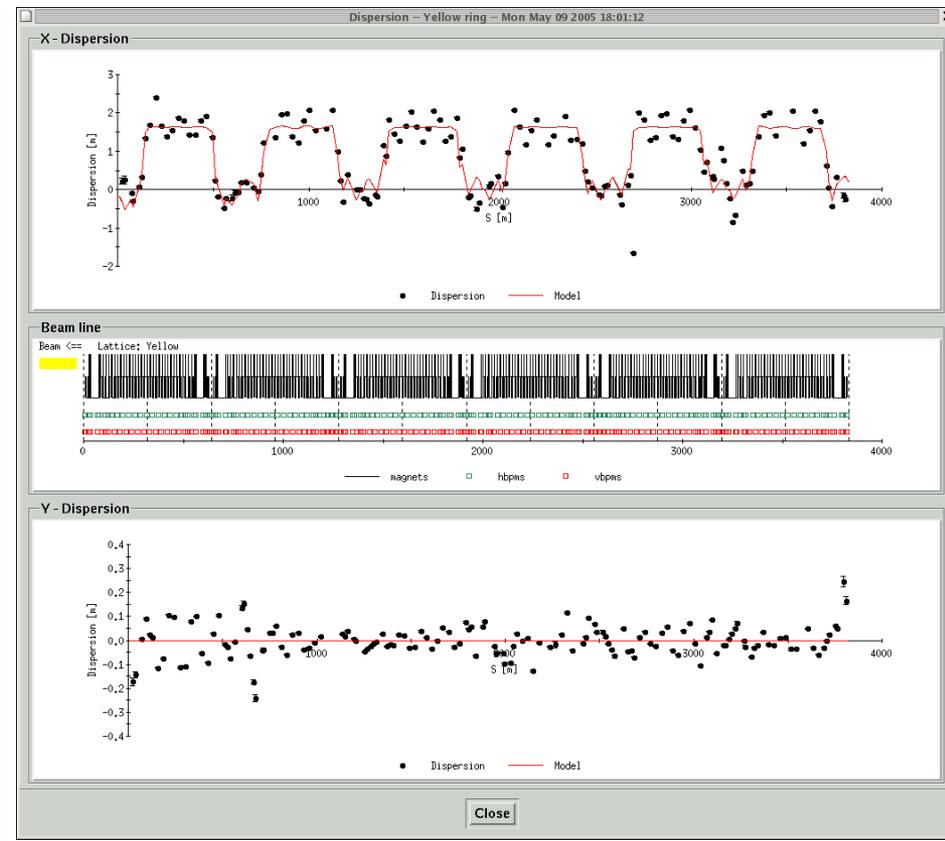
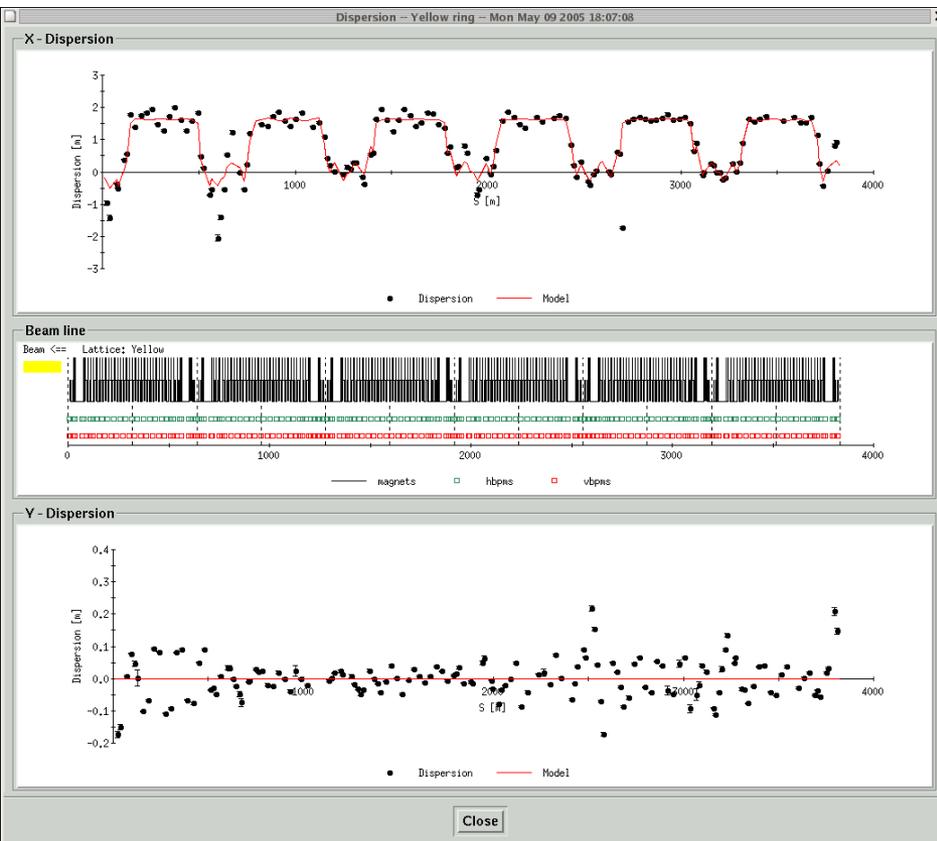
# Run-5 measurements

Yellow dispersion measurements done for different orbit angles

$$(\delta D)'' + g(\delta D) = g x_{co} - r$$

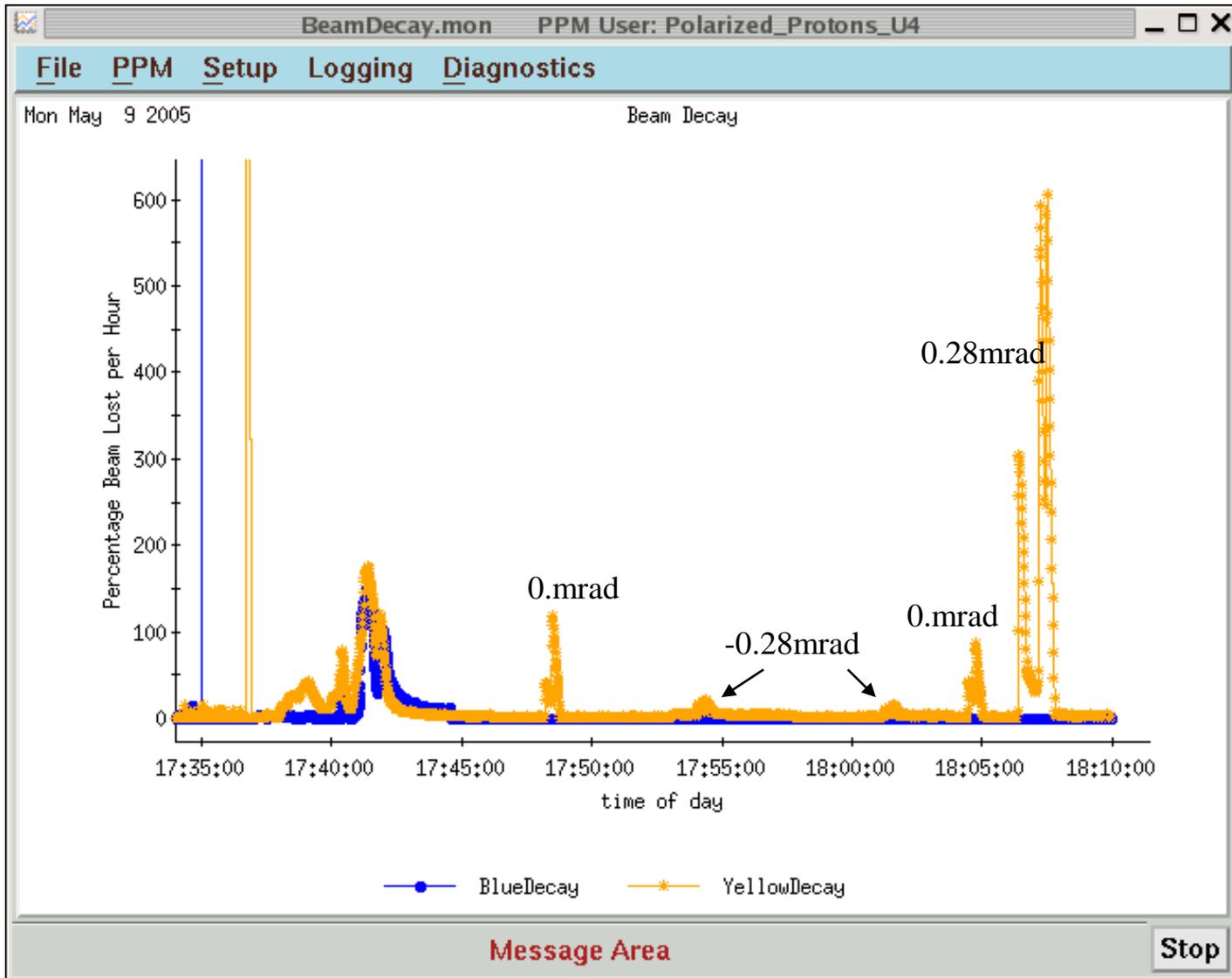
IP6 0.28mrad (IP8 -0.28mrad is similar)

IP6 -0.28mrad (IP8 0.28mrad is similar)

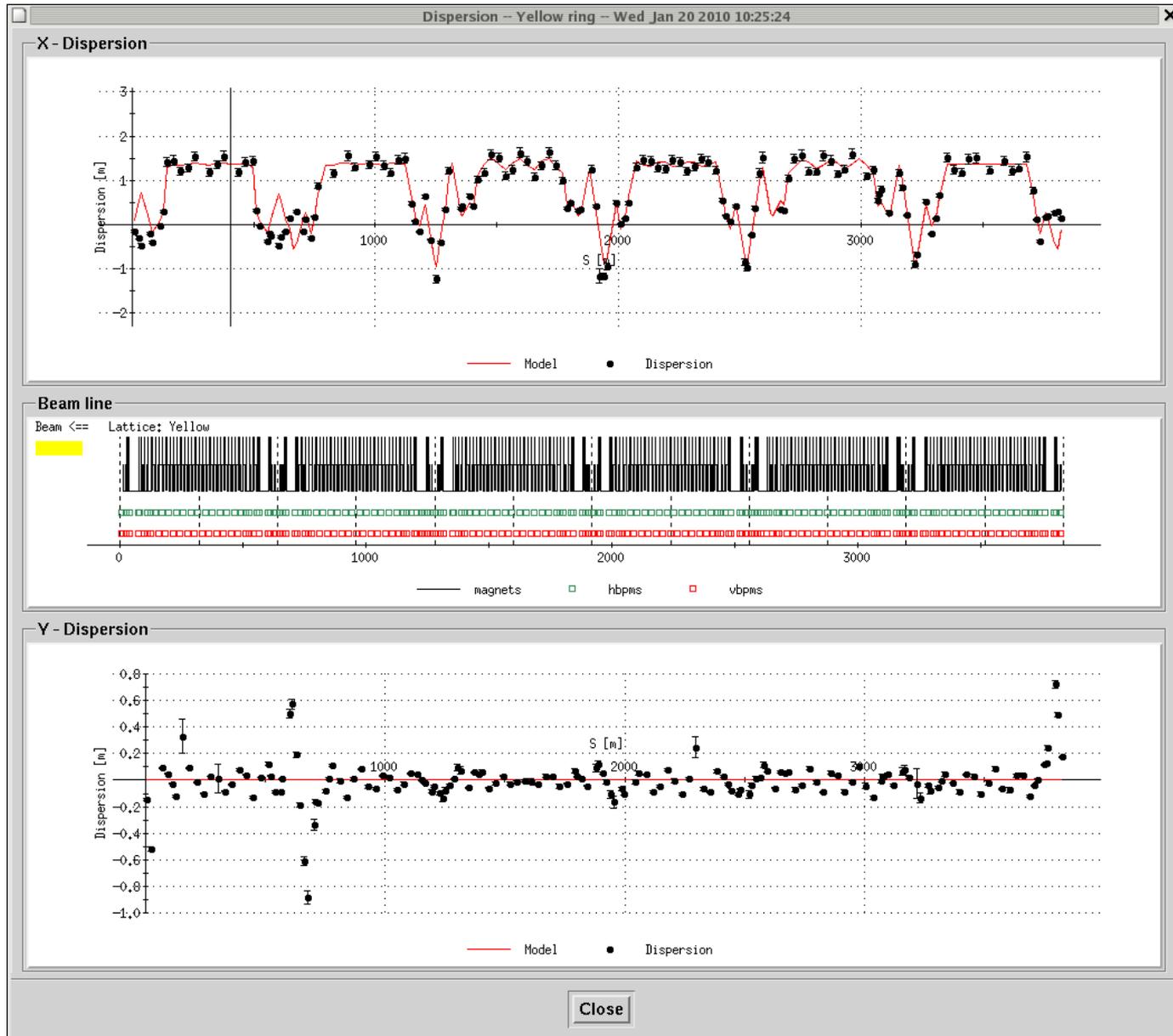


# Run-5 measurements

## Yellow beam decays from orbit angle in IP6



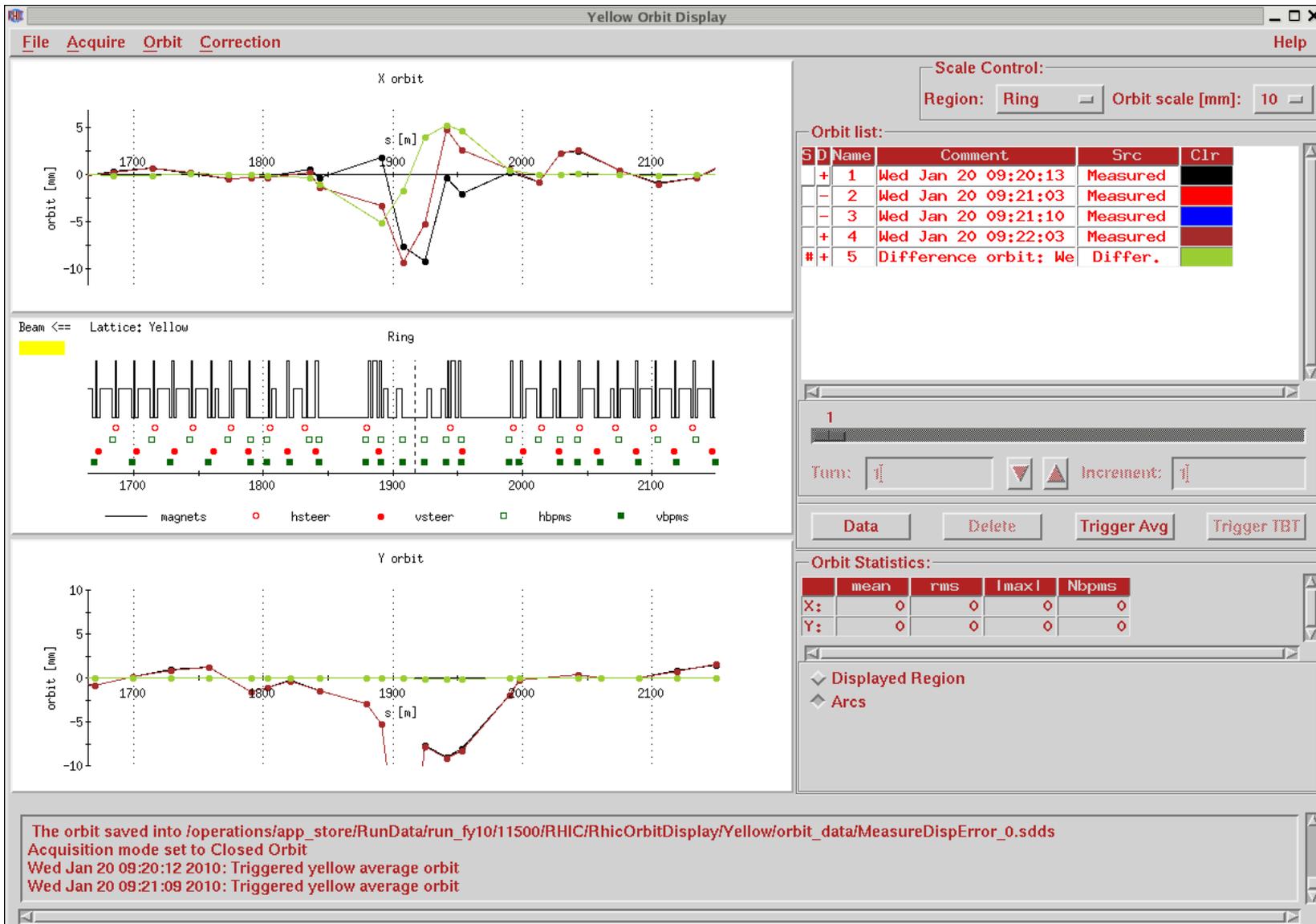
# Yellow dispersion (Au103), design and measured



# IR12 dipole correctors reproduce well the horizontal dispersion error wave



# Tried local orbit changes in IR12



Observed reduction of the dispersion in IR6 and IR8 ~20%.  
 Not good enough.

Yellow Orbit Display

File Acquire Orbit Correction Help

Scale Control:  
 Region: Ring Orbit scale [mm]: 20

Orbit list:

S	D	Name	Comment	Src	Clr
-	1	Wed Jan 20 09:49:52	Measured	Measured	Black
-	2	No comment	Logged	Logged	Red
-	3	Wed Jan 20 09:50:03	Measured	Measured	Blue
-	4	No comment	Logged	Logged	Brown
-	5	Difference orbit: We	Differ.	Differ.	Green
-	6	DispF (m)	Optics	Optics	Magenta
-	7	No comment	Dispers.	Dispers.	Yellow
-	8	Difference orbit: We	Differ.	Differ.	Cyan
+	9	No comment	Dispers.	Dispers.	Purple
#	+	No comment	Disk	Disk	Grey

1

Turn: [input] Increment: [input]

Data Delete Trigger Avg Trigger TBT

Orbit Statistics:

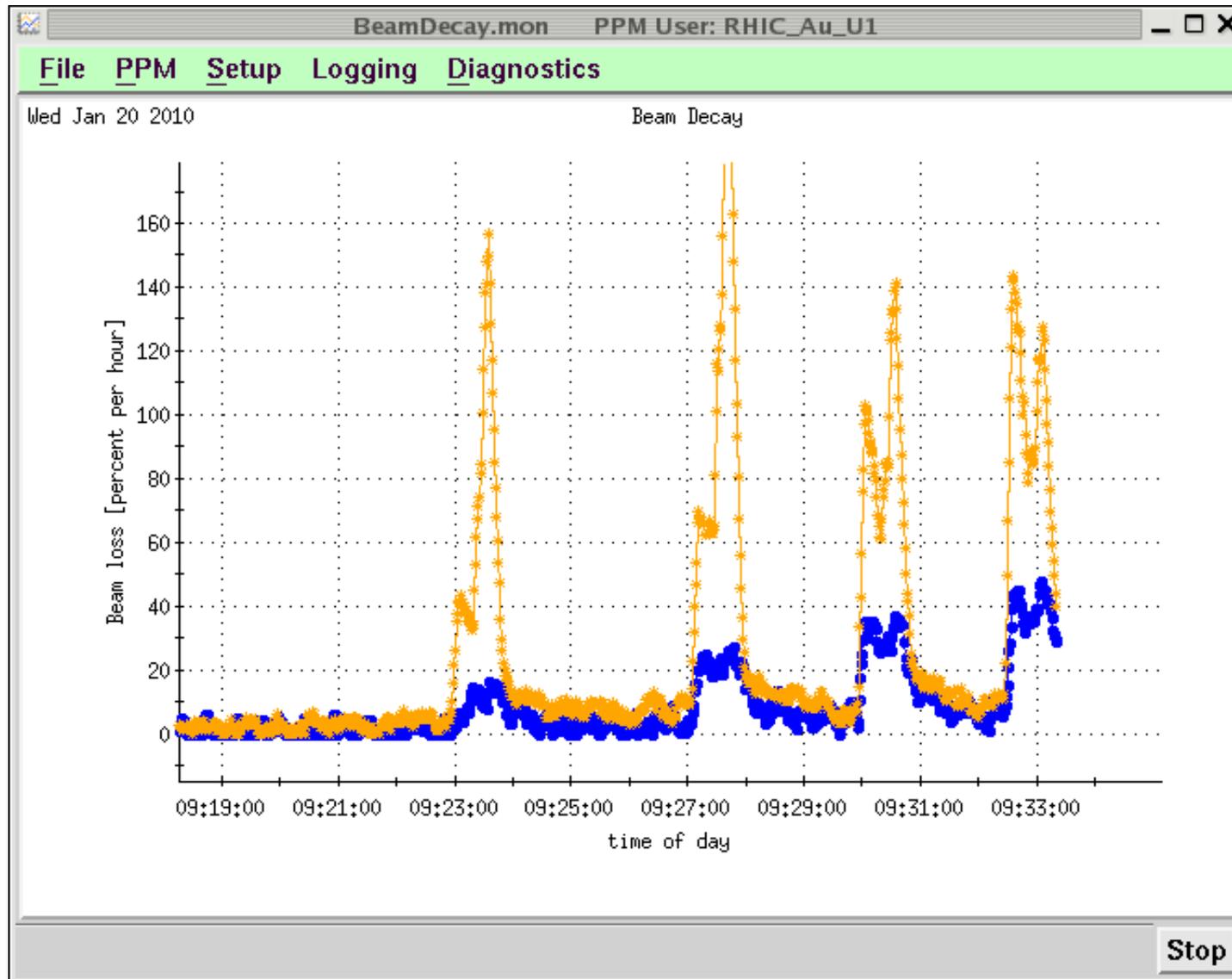
	mean	rms	max	Nbpms
X:	-0.1141	0.11441	0.30185	61
Y:	-0.0104	0.07944	0.16205	69

Displayed Region  
 Arcs

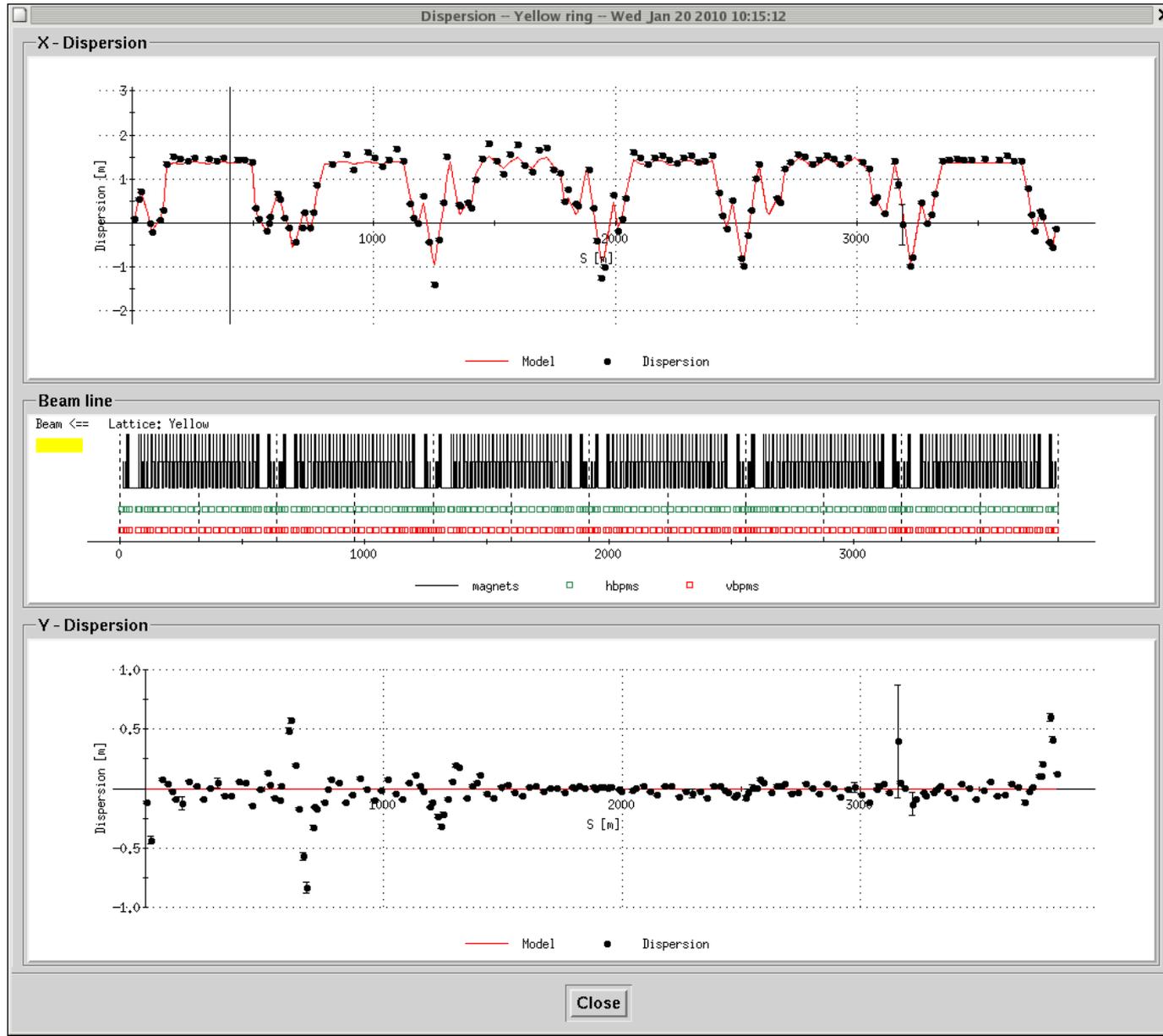
The orbit has been loaded from /operations/app\_store/RunData/run\_fy10/11500/RHIC/Chromaticity/Yellow/data.2010-01-20.09.48.24log.orbit-0.sdds  
 Acquisition mode set to STOP  
 The orbit has been loaded from /operations/app\_store/RunData/run\_fy10/11500/RHIC/Chromaticity/Yellow/data.2010-01-20.09.48.24log.orbit-5.sdds Cancel file loading  
 The orbit has been loaded from /operations/app\_store/RunData/run\_fy10/11500/RHIC/RhicOrbitDisplay/Yellow/orbit\_data/EnhancedMeasureDispError\_0.sdds

The interface displays three main plots: 'X orbit' (top), 'Ring' (middle), and 'Y orbit' (bottom). The X and Y orbit plots show displacement in mm versus position s [m] from 530 to 750. The Ring plot shows the distribution of magnets (black bars) and beam position monitors (bpmms) along the ring, with markers for hsteer (red circles), vsteer (red squares), hbpmms (green squares), and vbpmms (green squares). The right-hand side contains a control panel with a scale control, an orbit list table, a turn counter, and orbit statistics. A status bar at the bottom provides file paths and acquisition mode information.

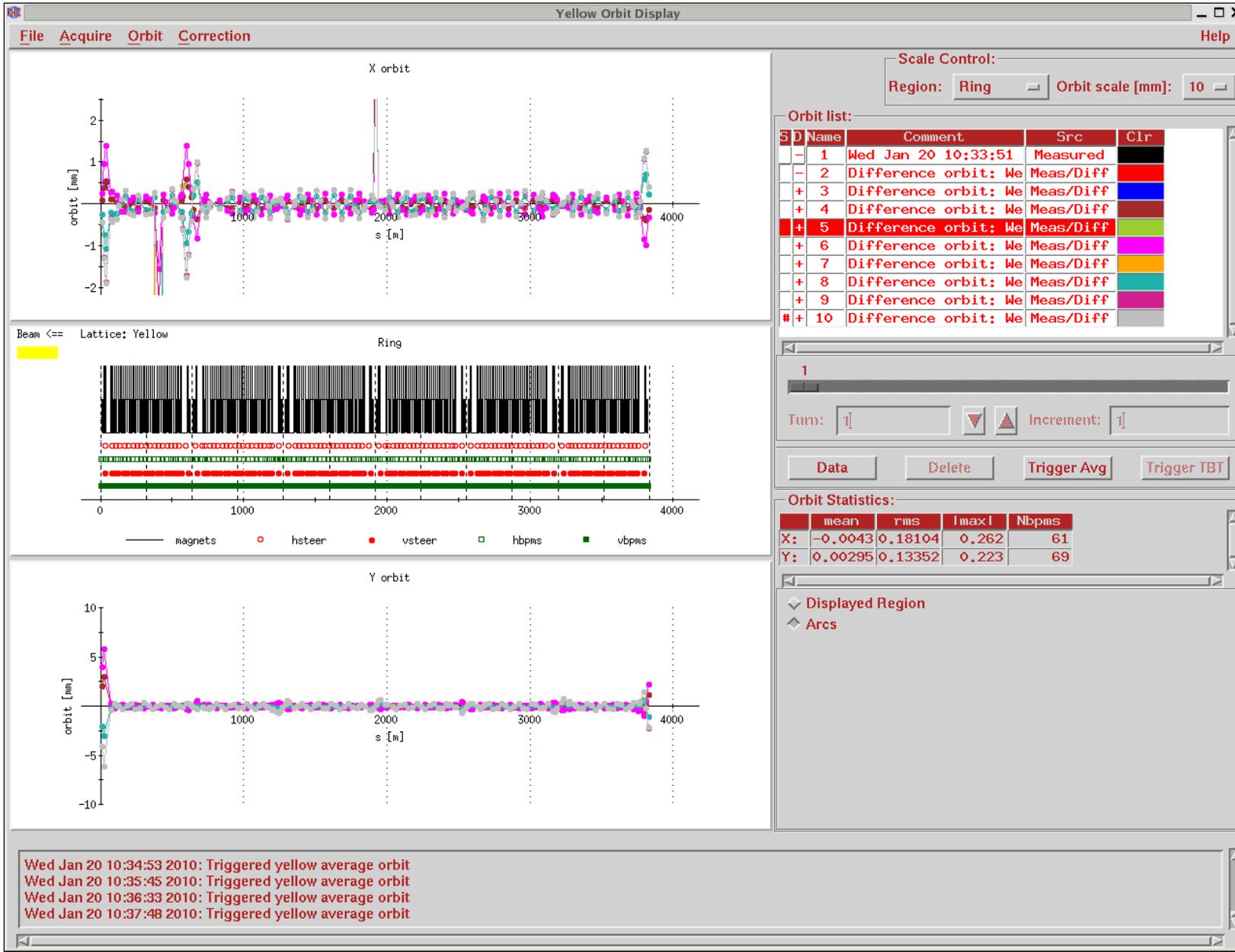
# Beam decay symmetry changes during IR12 orbit scan



# Horizontal dispersion locally corrected using IR6 and IR8 0.1mrad angle bumps



# Example of IR6 vertical orbit bump scan for local decoupling



## Summary of dispersion and skew quadrupole studies:

-Horizontal and vertical dispersion in IR6 and IR8 can be effectively corrected with small orbit angle bumps in those regions. But it did not provided obvious improvement in the momentum aperture.

-- The attempt to correct the dispersion at the suspected error sources (IR12 and IR4) was not effective, since quite large orbit distortion or skew quadrupole changes needed to compensate for the dispersion error completely.

-- The orbit bump data for IR6 and IR8 region in Yellow have been collected to calculate the required local skew quadrupole adjustments in those regions. Local coupling in IR6 looked noticable worse than that in IR8.



X dispersion error fitted with orbit at arc12

X-axis label



# Updates results from the gradient variation measurements

Beam Experiment. January 6, 2010

	Blue/Yellow			
	IR6 H	IR6 V	IR8 H	IR8 V
$\beta^*,m$	0.76/0.72	0.69/0.84	0.65/0.71	0.63/0.84
$s^*,m$	0.3/0.13	-0.13/-0.04	0.06/-0.33	-0.13/0.23

Accuracy:  $\delta Q = 0.0001 \rightarrow \delta s^* = 16 \text{ cm}, \delta \beta^* \sim 0.01$