Collision Vertex Distribution in PHENIX IR

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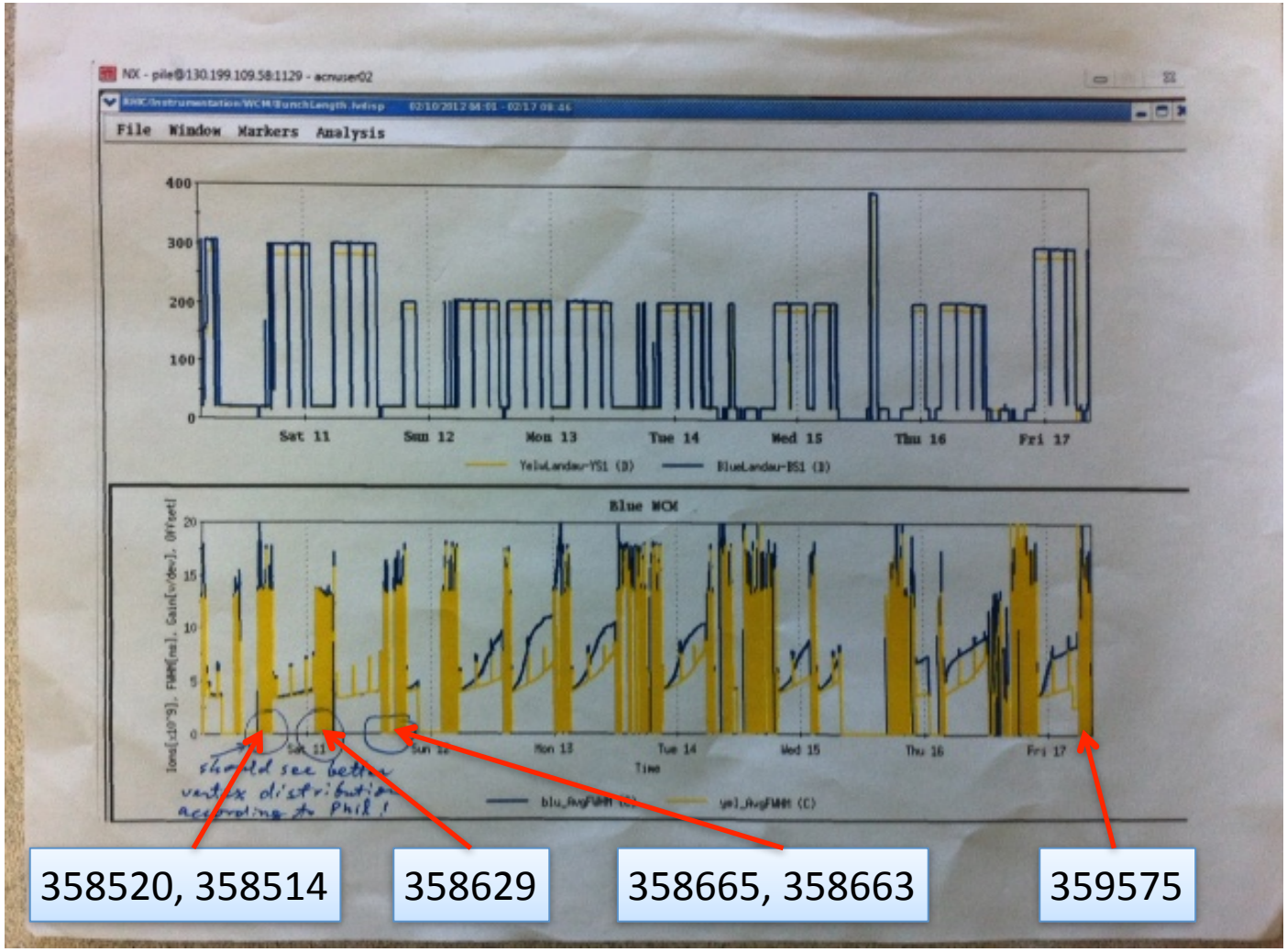
Background

- This document is to help C-AD to continue on improving collision vertex distributions seeing at PHENIX IR in order to achieve physics goals of using the vertex detector of PHENIX.
- As stated in the PHENIX BUP for Run-12, we need 20% of the p+p collisions within $|z|<10$ cm. So far we got about ~15%.
- I report here a few studied I did on the vertex distributions following a suggestion given by Phil Pile. Because of the longitudinal growth in blue beam in recent stores, Phil suggested that I should look at the very early stores from last Saturday (Feb 11). See the scan the plot from Phil Pile.

Bunch Length Plot from Phil Pile



Vertex Distributions (1)

Run#	Raw counts (noVTX cut)	Raw counts (narrow)	|z| < 10 cm
358520 (2/10, 7:30am)	130085623	35095902	18.0%
358514 (2/10, 6:23am)	276377590	76160732	18.4%
358629 (2/11, 12:56)	71832204	17926584	16.7%
358665 (2/11, 21:02)	176965749	45562884	17.2%
358663 (2/11, 20:45)	298970029	77784953	17.3%
359575 (2/17, 19:58)	2114834260	525669920	16.6%

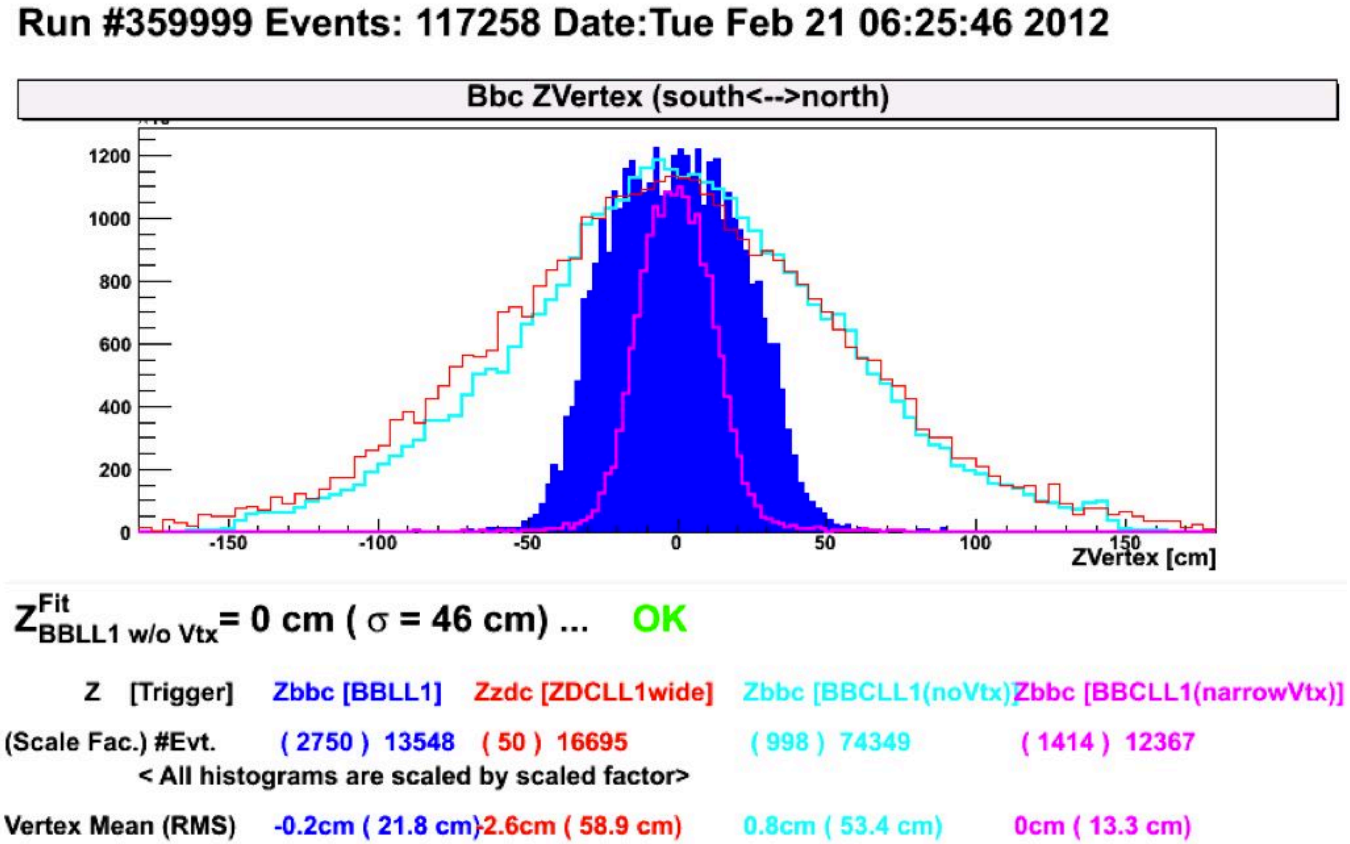
The last column is obtained by taking the ratio between the col-3 and col-2 and then multiplied by 66.7% since the "narrow" vertex is defined as |z| < 15 cm.

The conclusion is that we did see better vertex distribution on 2/10) !!! It is worsen now

Vertex Distributions (2)

Run#	Raw counts (noVTX cut)	Raw counts (narrow)	|z| < 10 cm
358750 (2/12, 19:30)	1109430689	257904080	15.5%
358771 (2/13, 04:58)	1437375899	359283022	16.7%
358986 (2/14, 20:26)	1145669014	299684712	17.4%
359062 (2/15, 04:36)	1598631635	403733858	16.8%
359317 (2/16, 06:14)	1447945442	352102757	16.2%
359575 (2/17, 19:58)	2114834260	525669920	16.6%

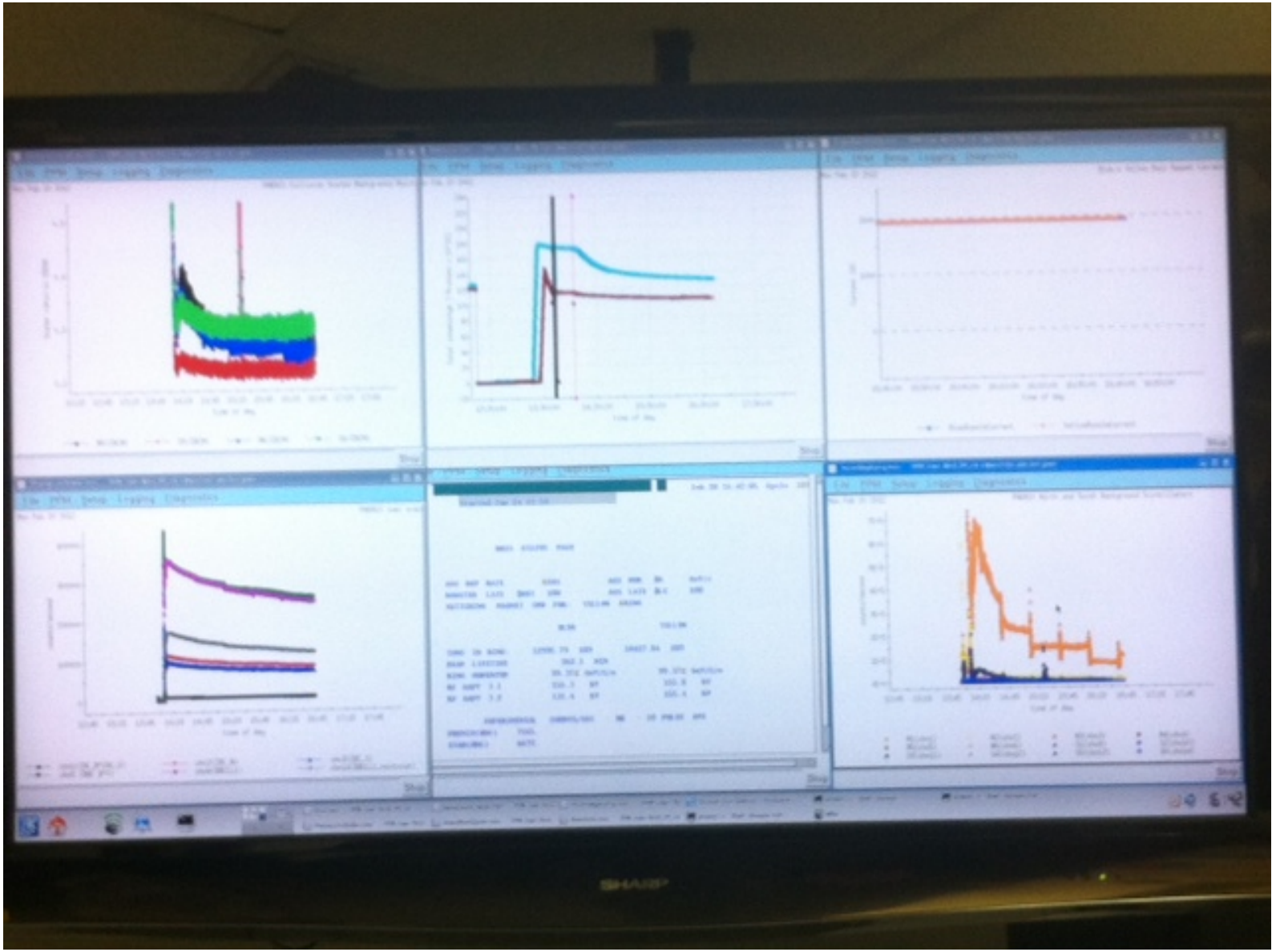
Recent F



We only got about ~15.6% events within |z| < 10 cm. The expectation is 20%.

* Correction: It was stated wrongly about our expected value as 30% at the Phil Pile Meeting (2/14/12)

Auto-orbit Correction (1)



Auto-orbit Correction (2)