

# Conclusions - Action items

ALL

**CDF/D0/AD luminosity meeting  
of April 27<sup>th</sup>, 2005**

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# Conclusions – Action items

- D0 introduced in their online luminosity measurements additional deadtime corrections on March 17, 2005. They also switched from AC coupling with short time constant to DC coupling with active baseline restoration. They are now less sensitive to backgrounds. They are in the process of re-evaluating the absolute efficiency of the detector to account for new magnetic field, new coupling scheme and new corrections. Currently they are reporting about 5% higher luminosity value than last summer for the same number of collisions. All corrections are expected to be implemented by the end of the summer.

# Conclusions – Action items

- CDF finds good linearity dependence between their measurements and AD “predicted” luminosities up to  $\mu=5$  (average number of interactions per bunch crossing) which corresponds to  $L \sim 1.8E32 \text{ cm}^{-2}\text{s}^{-1}$ . This was done by studying the luminosity information on a bunch by bunch basis. More data are needed to check higher luminosity regimes. AD will provide D0 with the same files of bunch by bunch predicted luminosities for similar comparisons.

# Conclusions - Action Items

- The D0 offline measurement of  $\beta^*$  indicates that  $\beta^*_x$  is approximately 33 cm and  $\beta^*_y$  36 cm on average, but they vary between 31 to 36 cm and 33 to 39 cm respectively. They see no statistically significant variations of  $\beta^*$  within a store. They are investigating detector alignment in y direction and trying to get the “predicted” luminosities for a few specific stores by using their measured values of  $\beta^*$ .
- The CDF offline  $\beta^*$  measurements indicate  $\beta^*_x$  values of approximately 29 cm and  $\beta^*_y$  values of approximately 35 cm on average, but there are store to store variations. The statistical uncertainties are of the order of 1.5 to 2.5 cm. CDF is mainly concentrating on validating their online measurements available on ACNET.

# Conclusions - Action Items

- Both experiments observe  $\beta^*_y$  to be bigger than  $\beta^*_x$ . After commissioning of the new BPMs, AD will be able to make lattice function measurements with sufficient accuracy to be able to investigate this.
- After the D0 adjustments, the CDF/D0 ratio is approximately flat as a function of store number and is approximately 1.11 on average for initial luminosity and 1.09 on average for end of store luminosity.

# Conclusions - Action Items

- If we assume that the  $\beta^*$  measurements of CDF and D0 are correct, then we have indications that about 5% of the luminosity difference between CDF and D0 could be explained by smaller  $\beta^*$ s in CDF. The uncertainties of the  $\beta^*$  measurements are still large though to allow for a firm conclusion.
- When the CDF/D0 ratio is plotted as a function of luminosity, it is significantly flatter than before. It is approximately flat up to  $7E31 \text{ cm}^{-2}\text{s}^{-1}$  with an average value of  $\sim 1.08-1.09$  and shows some luminosity dependence (up to 1.14) for the highest luminosity stores.

# Conclusions - Action Items

- Calculated luminosities are smaller than measured for both CDF and D0 after the Fall 2004 shutdown. The effect is more prominent for CDF for which the measured beta\* is smaller than the assumed one of 35 cm in the calculated luminosities. Another contribution (for both IPs) is that the effective emittance from FW is now bigger than before the shutdown. The measured sigmas, which are input in the emittance calculation, will be studied as well before and after the shutdown.

# Conclusions - Action Items

- Better accuracy lattice measurements (of the order of 5%) using the new Tevatron BPMs are expected to be available in about 2 to 4 months.
- Our next meeting will be planned for either the last week of June or for mid July.