CDF/D0/AD Luminosity Meeting

Introduction

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Luminosity changes

- After the March 2004 shutdown the CDF and D0 experiments report luminosities closer to each other.
- The ratio of the reported luminosities with respect to the "predicted" luminosities has also changed.

➢ In the next slide we will define how the "predicted" luminosity is calculated.

Predicted luminosity

$$\frac{10^{-5} fBN_p N_{\bar{p}} (6\beta\gamma)}{2\pi\beta^* \sqrt{(\varepsilon_p + \varepsilon_{\bar{p}})_x (\varepsilon_p + \varepsilon_{\bar{p}})_y}} H(\sigma_l / \beta^*)$$

Beam Widths/β*

- CDF and D0 fit their beam widths in x and y as a function of z to get β*, the emittance, ε, and the position of the beam width minimum, z_0.

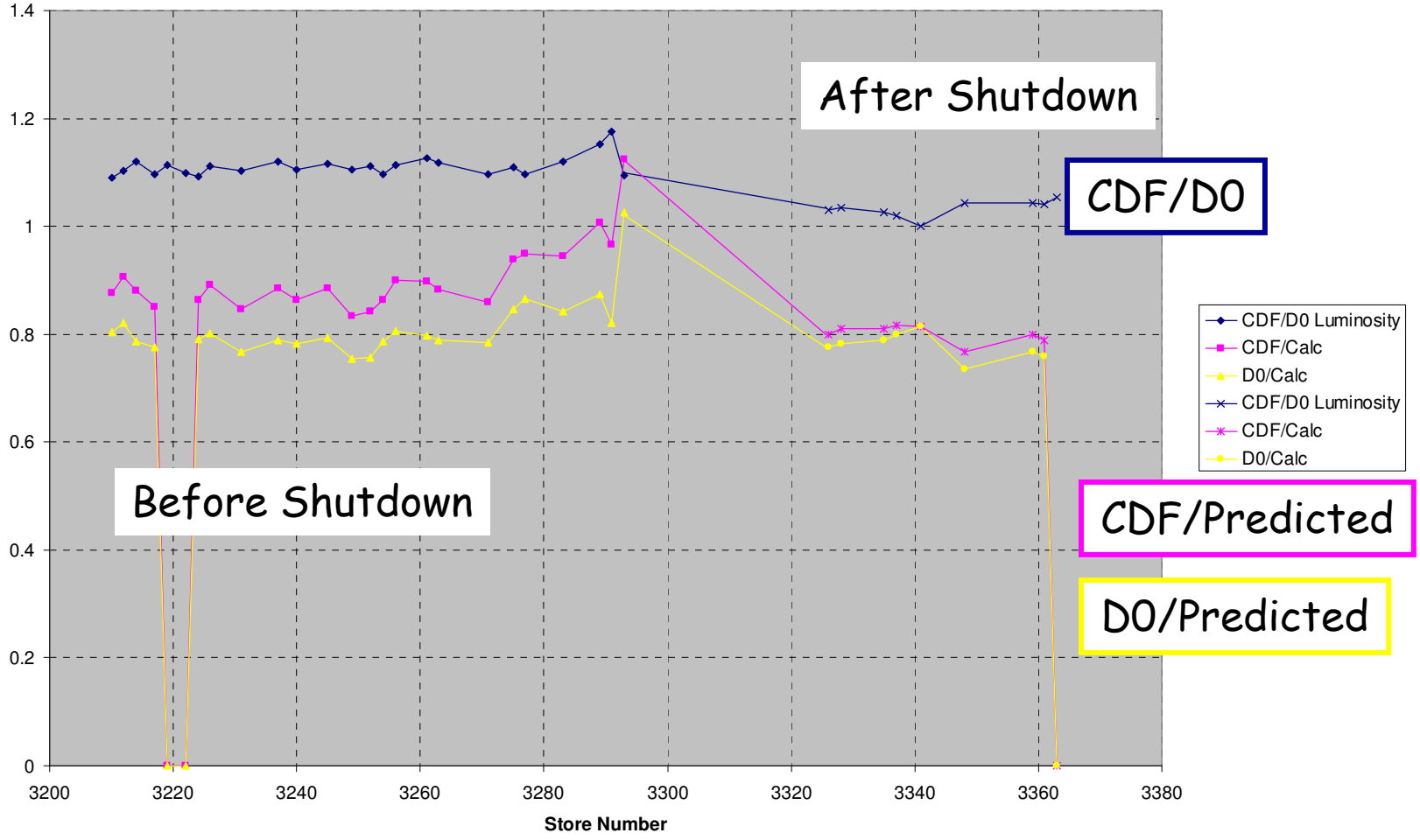
The formula they use for these fits is:

$$\sigma_{beam} = \sqrt{\varepsilon\beta^* + \frac{(z-z_0)^2}{\beta^*}}$$

Validity of above formulae

The above formulae are valid for gaussian beams;
They do not consider coupling and possible crossing angle and they assume that the proton and pbar beams behave in a similar way;
They also assume that the width formula stays the same independent of the ineraction of the two beams.

Ratio of Luminosities: Supertable



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In the following talks many related issues will be addressed in detail by the talks of the CDF and D0 experiments and by the talks of the Accelerator Division