

# Beam Width Measurement

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# Motivation

- = **Beam Width, or rather the width of the overlap of proton-antiproton beam, together with the beam position measurement is of importance for the successful operation of SST**
- = **It can also signal if there are any problems in the beam structure**
- = **Useful in order to monitor detector performance and beam geometry**

# Possible Methods

- **Use the vertex width**

- ◆ **Width is a function of IP resolution, number of tracks and track topology**
- ◆ **Vertices with a lot of high-pT vertices are needed -- one quickly runs out of statistics**

- **Use correlation in DCA of two tracks**

- ◆ **Assumption is that beam position is stable**
- ◆ **Beam is circular**
- ◆ **Much more powerful method**
- ◆ **I used this method to calculate beam width**

# Introduction

" Impact Parameter(IP) distribution of tracks, is convolution of primary vertex distribution, IP resolution with IP width

□ 
$$\sigma_d^2 = \sigma_F^2 + \sigma_r^2$$

□ *Where  $\sigma_F$  is actual beam width and  $\sigma_r$  is IP resolution*

" *I have calculated  $\sigma_F$  &  $\sigma_r$  separately from data*

" ***Idea:** extract  $\sigma_F$  from the measurement of the correlation between IP of track pairs exiting from the same primary vertex*