Estimate of Background

- **Phase 1 and 2 sample size**
- ***charm*** **and Interaction background**
- **Monte Carlo** (~10K events:*charm*/tau ; ~100K int.)
- **Method as in** *First Observation* **paper**
- **Includes trident secondary vertices**

Some details:

- Assume 420 events in sample

Interaction MC:

- Angle cut on secondary $\pi/K/p$: < 300 mrad
- Angle cut on primary track : < 250 mrad
- Momentum of secondary particles > 1 GeV/c

charm MC:

- same as above for interactions, plus...
- D^+/D_S = 1.65
- $\tau(D^+) = 317\mu m$ - $\tau(D_S) = 147\mu m$

for more details see : `http://www-donut.fnal.gov/internal/an/22May03/Sip1_bl.pdf`

Preliminary Results

Interactions:

From FOP : 0.16±0.04 events (for sample of 203)

Scaling to 10mm decay length + 420 events →

$(0.16)\ (420 / 203)\ (10\text{mm} / 5\text{mm}) = 0.66$

Tridents →

$(7.5\times10^{-4}\ \text{mm}^{-1})\ (3.4\text{mm}\ Fe)\ (0.26\ \text{"NC"})\ (420) = 0.28$

300μm <IP> cut → $= 0.06$

Subtotal $= 0.72$

Preliminary Results (cont)

charm:

From FOP : 0.18±0.03 events (for sample of 203)

Scaling to 10mm decay length + 420 events →

$(0.18)\ (420 / 203)\ (1.41\ [5 \rightarrow 10\text{mm}]) = 0.53$

Tridents →

$(0.18)\ (420 / 203)\ (1.41\ [5 \rightarrow 10\text{mm}])\ (1.42\ [\text{C1} \rightarrow \text{C3}]) = 0.75$

300μm <IP> cut → $= 0.46$

Subtotal $= 0.99$

Preliminary Results (cont)

Interactions :	0.72
charm :	0.99
Total	1.71

Fluctuation probability to 7 events $= 1.5 \times 10^{-3}$

Of course, this is a very conservative number compared to results with $N_{parameter}$ - dimensional analyses.